

APPENDIX D Written Testimony from January 9, 2002 Public Hearing

PUBLIC NOTICE

PUBLIC HEARING

To Consider

DESIGNATION OF THE IAO and WAIHEE AQUIFER SYSTEMS AS
GROUND WATER MANAGEMENT AREAS

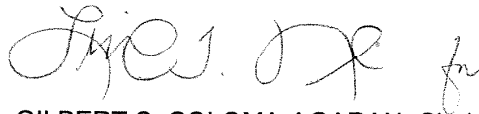
COMMISSION ON WATER RESOURCE MANAGEMENT

The Commission on Water Resource Management (Commission) will be holding a public hearing to gather testimony regarding the petition to designate the Iao and Waihee Aquifer Systems of the Wailuku Aquifer Sector on Maui, as Ground Water Management Areas, in accordance with Department of Land and Natural Resources Administrative Rules Subchapter 2, §13-171. In a water management area, all ground water uses from these aquifers, excepting individual domestic users, would require water use permits from the Commission.

Call 587-0225 or 1-800-984-2400, extension 70225 for more information on the designation process or visit our website at www.state.hi.us/dlnr/cwrm. The public is encouraged to attend and provide testimony. Written comments are due to the Commission at 1151 Punchbowl Street, Room 227, Honolulu, Hawaii 96813 no later than January 9, 2002.

DATE: January 9, 2002
TIME: 7:00 - 10:00 p.m.
PLACE: Wailuku Community Center
395 Waena Street
Wailuku, Maui

COMMISSION ON WATER RESOURCE MANAGEMENT



GILBERT S. COLOMA-AGARAN, Chairperson

Dated: November 28, 2001

Publish in: Honolulu Star Bulletin and Maui News issues of **December 10, 17, 24, 2001**

Department of Land and Natural Resources
Commission on Water Resource Management

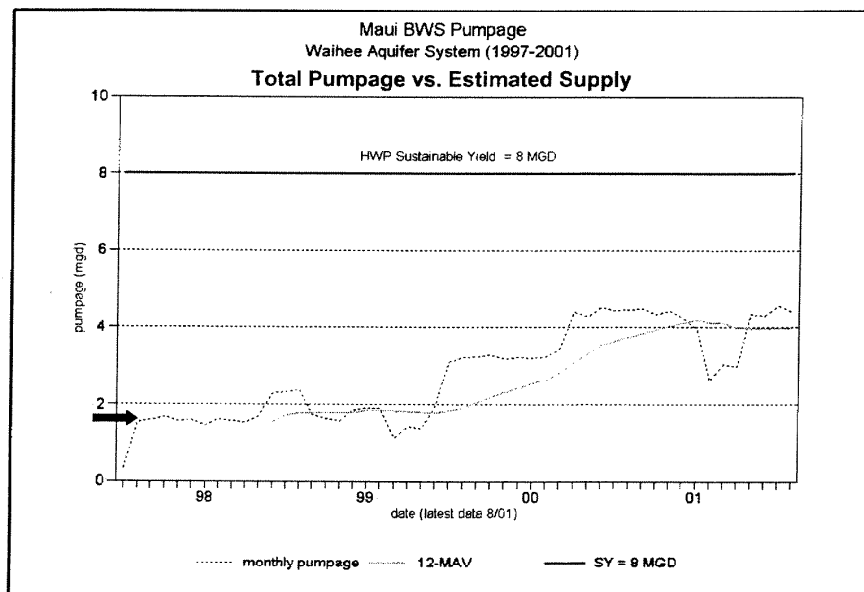
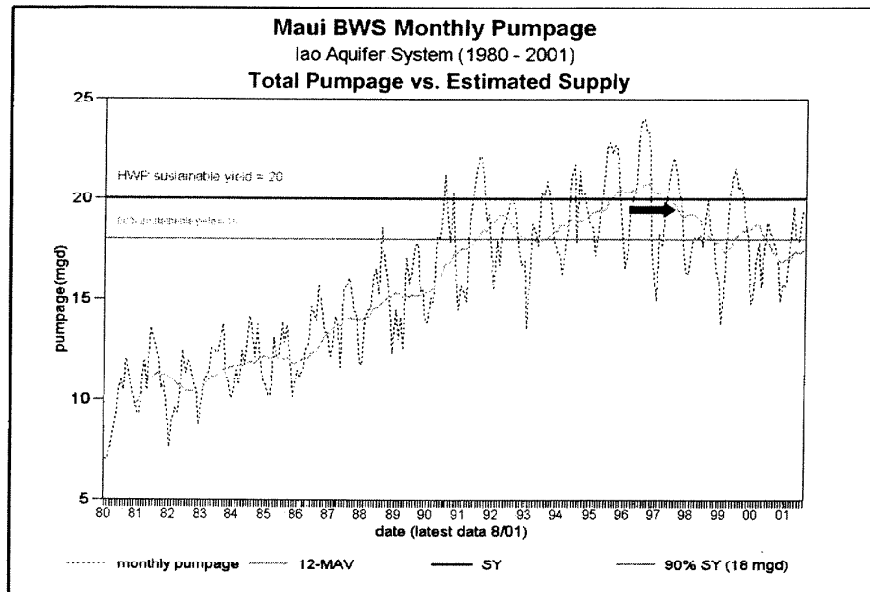
Iao & Waihee Petition for Designation



Department of Land and Natural Resources
Commission on Water Resource Management
Iao Aquifer

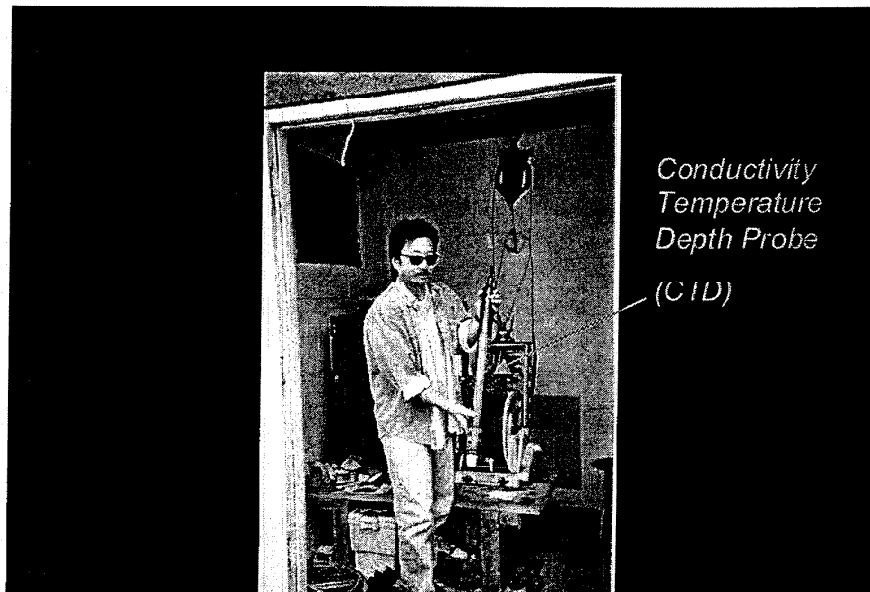
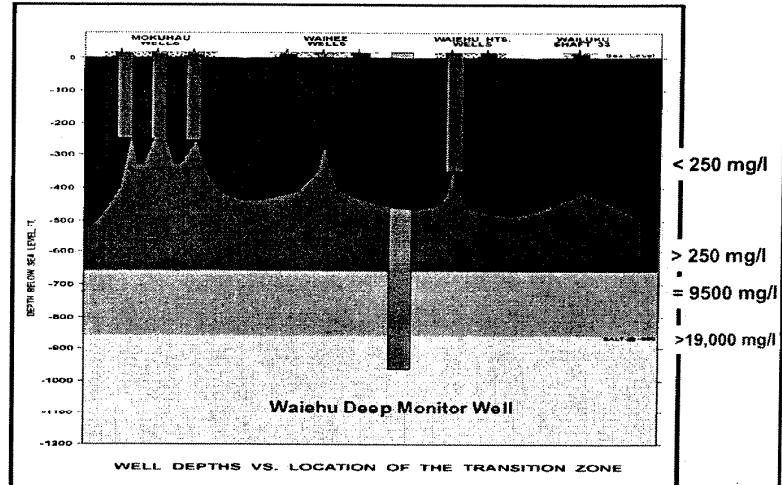
↖ Iao Background on Designation

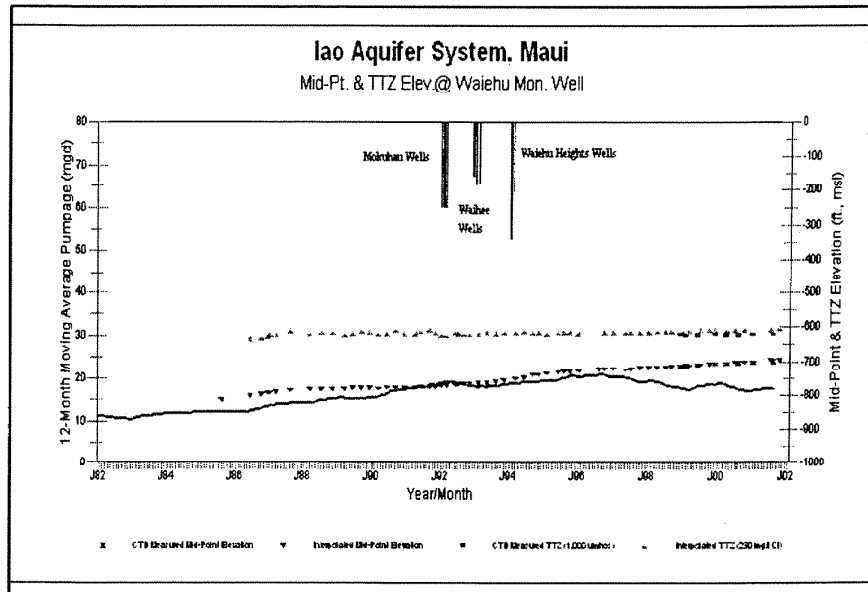
- 1986 BLNR - Ground Water Control Area Proceedings (HRS 177)
- 1990 CWRM - Water Management Area Proceedings (HRS 174C)
- 1997 CWRM Decision:
 - No designation
 - If 12-month moving average pumpage exceeds 20 mgd = designation
- 2001 New Petition from Public to designation
 - 5 issues
 - Iao Sustainable Yield should be < 20 mgd and no increase offered from Waihee
 - Alternative sources in Waihee do not relieve stress on Iao
 - Chloride concentrations are rising faster than ever
 - Water levels are at record lows and not because of drought
 - Development pressure through continued water meter approvals within and outside of Iao Aquifer is placing greater reliance on Iao.





Department of Land and Natural Resources
 Commission on Water Resource Management
 Iao Aquifer





Department of Land and Natural Resources
Commission on Water Resource Management
Iao Aquifer

Conclusions

- Situation is similar to that found during 1997, but moving in the right direction of spreading pumpage:
 - North: Waihee wells
 - South: Waikapu wells, Shaft 33.
- Optimization within Iao is required to realize 20 mgd sustainable yield.
- Optimization of Waihee is required to realize 8 mgd of sustainable yield.
- Alternative sources outside of Iao are necessary to accommodate future demands
- Important to continue to monitor 20 mgd 12-month moving average and deep monitor well and pumping well behavior.
- If 12-MAV of 20 mgd is exceeded CWRM will meet to designate Iao.

Commission Actions (November 14, 2001)

- The Chairperson recommend and the Commission approved unanimously that:
 1. Continue the Petition to designate both Iao and Waihee Aquifer Systems.
 2. To continue with its August 13, 1997 decision that requires automatic designation of the Iao Aquifer System should the 12-month moving average reach 20 mgd.

email 12 Sep 02

Ellen Krafton - approved by Dave Craddock

Testimony to CWRM - January 9th, 2002- re: Iao Designation

The fundamental question to be asked is whether designation will result in improved protection of the resource, or if not, then WHAT WILL result in more ideal resource protection. One can not question the good intentions and validity of the concerns of those who are opposing local groundwater management.

In fact we agree with their fundamental goal, which is to protect our resources, and even with many of their concerns.

We would propose the following solutions to enable stronger resource management, and suggest that they would be more effective than designation. improved coordination in land use decision making: One major point is in permit conditions. The county government should support the dws when we ask that monitoring and reporting to DWS be a condition of discretionary permit approvals. (pumpage, chemical application, etc.) better yet, we should not have to request such information. any private water use or regular chemical application should be subject to reporting to DWS. this could and should be added to both our rules, and county policies.

clarification of charter in terms of dws role for resource protection: The county charter should be clarified to say...not only that the county department shall have jurisdiction & responsibility to protect, water systems "owned and operated by the county" - but ALL water resources within the county. as it is, it depends upon which lawyer you speak to whether the charter actually gives us the authority to do what we need to do...and then depending upon political winds or other factors, our resource protective suggestions and efforts can be ignored or over-ruled. but this is a problem that can be remedied, and doing so will give us more leverage to insure resources are protected.

dws approval of well permits at county level

projects involving well permits should be required to obtain county permits as well as State permits. County permits could insure, not only compliance with state well construction standards, but also compliance with standards for adequate back-up and for storage & etc.; as well as setting an allocation based on proposed use and reporting requirements. continued, verifiable reporting could become a condition of this permit...with project approvals subject to being rescinded for failure to comply. this would result in an easier time managing and keeping track for both county and state...and it might also decrease the number of inappropriately sited and poorly designed private wells.

coordinated consideration of quantity and quality issues:

At the state level, cwrmm and doh each have their own kuleana - cwrmm "quantity" and doh "quality". We need to work with those agencies to improve coordination. But also, at the county level, we have the opportunity to combine these concerns within one agency, and we should avail ourselves of that opportunity. by making a stronger dws with a more clear mandate for resource management and control.

cwrmm & dws could expedite inspection of existing wells of unknown. this was actually already begun within cwrmm and discussed as a future effort within dws & doh source water protection program. but it involves staffing that neither cwrmm nor dws has at the moment. however, this could be expedited with temporary staff...possibly even with grant funds. some of this data is more "known" than some people realize...as in...efforts were made to locate accessible wells with good quality water for back-up years ago, and known data on chloride levels compiled, even some effort to find certain wells was made. in many cases, the location and what we know about water quality in the area makes it certain that the wells are not functioning at substantial levels. witness the plethora of wells along the kihei coast. most are defunct.

coordination between dws and cwrmm to CLARIFY and be CONSISTENT with published data and caveats regarding aquifers: one example is the sustainable yield map posted on the cwrmm web site. it indicates that the sustainable yield of the haiku aquifer having 31 mgd as its sustainable yield, even though mink's text says that this is a pre- irrigation estimate, and that it is currently likely more like 15.

coordination between dws and cwrn to SUPPORT dws concerns re: reserving water for municipal use where other proposed uses conflict with public plans:

clearly, as a government agency, our capital projects are subjected to a higher degree of environmental review and public scrutiny than those of other entities. this is as it should be. HOWEVER, it does have the effect of making our source projects more slow to reach completion. For that reason, once a plan or direction has been set forth, gone through public process, and approved, CWRM should honor DWS requests to set coordinating conditions upon or deny other proposals that would conflict with or hamper municipal plans. CWRM, in coordination with USGS and The University, can suggest guidelines for pumpage distribution and operational management. If such suggestions were made, we would honor them. we have done as much with what were USGS recommendations by well field for years. this can be done without designation. it takes some will on the part of the State to stand up and select an amount and a schedule. The Water Use And Development Plan Process Should be Used to Resolve some of these Resource Issues, and such efforts have been started in Lana'i and Lahaina

The Water Use and Development Plan process stipulates a serious coordinated look at public concerns with regard to resource management, and at the relation between capital programs and other values, such as resources. As part of our preparatory research, we have reviewed resource policies elsewhere, including availability policies, wellhead protection policies, and other standards for protection.

We have been trying to utilize the water use and development plan process to get at people's preferences regarding various key policy issues that effect resource management. granted we are only part way through the lahaina and lanai districts, but the other districts are coming. but the answers to these questions, and the act of codifying these answers in the water use and development plan - will go far to improve resource management. if we can get there without losing our prerogatives too soon. At these committees we are asking questions like“how long do you want to have available new fresh resources of water”? and “what are you prepared to do to insure that ?” and do you believe growth should be paced to support sustainability. and IF so, to what extent? these questions are being asked and discussions of associated issues taking place at the wacs (water advisory committees). questions like - should every legal lot be entitled to at least enough water for one single family home? or not? this implies very different actions in terms of our reserves and our approval process and water commitments. we need community input on this. the state will not care.

Community Support for Looking Openly At These Issues - TOGETHER as a community, instead of in a polarized discussion over the benefits of giving up control, would do much to improve our collective management of all island water resources, not just the lao. we still try and will continue to try very hard to protect these resources for all of our sakes. Regarding the status of lao aquifer itself... The following are our current activities and efforts toward protection: - projects to better distribute the withdrawals within the aquifer - projects to re-locate withdrawals outside of the aquifer (development of source outside the aquifer) - purchase of lands (some done, some still in the works) for watershed management and protection - funding of watershed management and protection efforts - groundwater protection - conservation - we only have about 30,000 meters, but have given away more than 20,000 low flow fixtures. retrofit programs are under consideration, once evaluated by the cost-benefit model, since there is already an ordinance requiring the use of low flows. we already do flow and pressure monitoring, leak detection, for suspected problem areas, etc. CWRM would not have the authority, funds, nor staff resources to implement any of that. Instead, they would be required to instigate a time consuming and complex permitting process, which would of necessity require, not only the desired research, monitoring, public process and documentation - but also a great deal of formalized permit drafting and public process work that would actually have the net effect of distracting the limited staff of BOTH agencies AWAY FROM the very job of resource protection on which we all agree we need to focus. no one can be as vested in a resource as those whose well-being, and children's well-being depend upon it. that fact alone argues for improved home rule, over forfeit of home rule.

there was one more suggested solution item , but can't remember it, and didn't have it on my script.

[Did not say any of the following except that loss of home rule could result in less control for local people] tie well permit issuance to a defined use: Longer term, we feel that the state water code should be re-written

such that all well permits are granted with an actual pumpage amount. This should happen with or without designation.

even with designation, the State would not be any more able than it is now to implement solutions: It may be that people also misconstrue what the State can and will do under the current system. if lao is designated, this does NOT mean that withdrawals "around" lao will be managed. the State currently addresses itself only to those areas that are actually designated. and even within those areas, all it can do is set a pumpage amount and levy fines if it is not met. It does not have the authority, nor the staff to physically control or manage anything, nor the funds even to manage at the level we do.

diminished local prerogatives: We think very highly of CWRM staff, and want to state that this next point is not specific to them, but is the general way of things. Unfortunately the further UP the chain decisions move, the more removed from the purview of the effected public they become. by moving things away from the local level...sooner or later... people are less informed, those who would become involved have to suddenly spend more \$\$ and effort to go to the decision makers; the wishes of the local community become less important. like it or not, that happens. i.e. - local stakeholders ESPECIALLY the little guy, end up with LESS influence, when they thought they would have more.

loss of checks & balances: In addition, State politics fluctuate as much as county politics. Whatever the present commission does, there is no guarantee that local residents would be as happy with future commissions. At least as it is now, at least there is the safety of TWO political structures (checks & balances) so that if a given undesirable action is supported one administration's political agenda, there may yet be another administration and agenda to counter it. Taking control away from the local level will only diminish this level of protection.

potential for diminished attention to Maui Resources CWRM staff are excellent. But CWRM is so under staffed and poorly funded that they really haven't the time, staff nor resources to do what we have slowly, steadily been building toward in terms of resource protection.

competition for funding if we are farmed off to the state and then dependent upon their good graces and budgets for resource protection funds....not to mention that we would have to compete with Honolulu for funding and attention, if that happened

precedent: honolulu has not shown the desired restraint in development - even with the state's oversight right there; molokai permitting process is STILL incomplete even though designation occurred in 1992; Lana'i on the other hand, has benefitted greatly by non-designation, but increased coordinated effort. honolulu, by their own estimates will run out of new sources of fresh water by 2020. we have made it clear to both the State cwrn and others that we don't want to follow that example. and have repeatedly raised the question of policies for sustaining this resource at water advisory committee meetings for the wudp, at council and within the dept. these issues are being discussed. but would the discussion die with designation?

DWS is actually a conscientious manager of water resources. There is room for improvement, but we are progressing. Just for the record.... we just received a letter from EPA last month.....the last sentence of which reads..... "The Maui County Department of Water Supply is a leader in source water protection and an example for other county and state agencies."

potential loss of board commitment to resource protection as an appropriate dws function?: my fear is that all these strides we have been slowly making, all this resource protective capacity we have been slowly building into the dept and especially this division, will no longer be supported by a structure in which we have farmed this responsibility off to the state, and that ultimately we could lose our momentum toward stronger resource protection. i think that would ultimately be a loss to the community, because i don't see how cwrn, based in honolulu with such limited staff, could ever do these things that we have been starting to build.

Testimony of Lucienne de Naie
Maui Tomorrow Ka Waiola Project
572-8331/ laluz@maui-tomorrow.org

The COWRM is to be applauded for taking on the complex issue of determining the most effective management strategy for Maui's 'Iao Aquifer. It is our understanding that the Commission staff is sending letters to all listed water users in the 'Iao aquifer area to determine their pumping use. This is a necessary part of the planning process, but common sense would indicate that additional data would need to be requested from users slightly outside the usual boundaries of 'Iao aquifer.

The reason for this is that we do not yet have a definitive answer to the question: Where do the waters of the so called 'Iao aquifer begin and end? It is widely agreed that the boundary lines defining the 'Iao aquifer on our maps have no relationship to actual bodies of subsurface water that are confined to a particular geological space. It is also widely agreed that the upper elevations of the region have the most potential to receive recharge to the aquifer. Knowing this, it would seem wise to examine areas of what we have labeled Waihe'e, Waikapu and Kahului aquifers that lie in close proximity to the administrative boundary of the 'Iao aquifer to determine if groundwater useages in those areas are having an effect upon the sustainability of what we are calling 'Iao aquifer. Only then can it become clear what demands are being placed upon the entire system.

It has been suggested that the current sustainable yield of the 'Iao aquifer could be considered 20mgd only if the waters of what is now considered the North end of the Waihe'e aquifer are included. It has also been estimated that the Kahului aquifer only has a sustainable yield of 1mgd yet there are a number of irrigation and industrial use wells operating in that aquifer that have use figures listed in the CWRM data base of nearly 22mgd. Are some of these sources being supplied by water from the 'Iao aquifer? A number of the sites, such as Keopuolani Park are virtually on the boundary of the 'Iao aquifer.

In conclusion: A number of withdrawal sites in various "aquifers" could realistically be affecting water levels and recharge in the 'Iao aquifer. Commission staff should consider expanding their inquiry of pumping usage to include these sites. Maui Tomorrow will be happy to forward data collected through their individual research efforts to be included in this body of information.

A VIEW OF SOME CENTRAL MAUI WELLS AND THEIR USES

Iao Aquifer well use: 8 County DWS Wells 17.5mgd
5 County park wells .43 mgd (est)
total known use: 17.43 mgd

Waihee Aquifer: 4 County DWS wells (including Kanoa #2) 3.97mgd (wells only)
Kanoa #2 expected capacity 1.15 (pumped.126 mgd in 2001) additional expected pumpage= 1.024 mg
other Waihee wells:
3 8" diam irrigation wells (drilled in 1990's) ranging in depth from 200 to 600 ft. (County wells are 332- 687 ft) in same area similar 8" diam wells can generate pump capacity listed can generate.1 mgd in use.
Est.use: .2mgd for 3 wells

Total projected current use: 4.17
Total use with Kanoa #2 well: 5.19 mgd

Total Central Maui region use: 22.62mgd
addition of Kupaa well could add another 1mgd to the equation and the water Dept has already "promised" that the two additional No. Waihee wells will add 3mgd of capacity to the Central Maui system.

Kahului Aquifer wells:
Parks Dept (6 wells) .399mgd
Estimated usage by wells surrounding Maui Lani subdivision (Tom Nance, 1997):
HC&S 42.08mgd
Maui Land & Pine 1.735mgd
5 other wells: .122mgd
Maui Lani irrig estimated use .85 mgd
total estimable Kahului aquifer use: 45.186mgd

Wednesday, January 09, 2002

Sean Lester

State of Hawaii Water Board

Commission on Water Resource Management

Dear Commissioner,

I have been a resident of Maui County for 11 years. As an upcountry landowner with a small farm/residence, I have seen my farmer neighbors as well as myself struggle with water shortages that threatened our crops. We have had to deal with a very confused County Water Board whose direction and basic purpose are at odds with the most basic needs of the citizens of Maui – the need to insure a high quality, steady source of water for now and the future, and to insure the sources of these waters remain uncontaminated by salination and other sources.

It is this future that Mr. David Craddick and the County Board of Water Supply seem to be working toward destroying, with a decades long list of mismanagement, questionable deals with developers and aggravated by a misunderstanding of the mechanics of professional water management.

As I began to look more closely into the issues surrounding water in Hawaii and on Maui I have seen a picture of a county water board and Director of Dept of Water that have little knowledge of the value of our resources, and no understanding or will to distribute or manage these resources fairly and by the laws of the State of Hawaii. David Craddick has had no problem with handing out all of our available resources to new development. Our future is already tied up by the allocation all of the available water in the county to this development. Even when the figures of outstripped sustainable yields, salination of wells (USGS records) and other alarming figures and presentations are given, the answer is to say simply – the water is there or will be found, and they keep handing out more and more permits as our wells become more salinated day by day.

As a matter of record, if you count all of the Maui County permits handed out as of today and see that we have outstripped the available, sustainable yields on all water sources which the County of Maui has available. I do not believe water can be handled like the Federal Government's budget – if you run out of water, you can't just pay interest and hope you will do better tomorrow. Either we have sustainable water sources that can be protected for our future, or we do not. According to the USGS, we are already out of the safety zone that would have been afforded us by having a comprehensive water resource planning in place. We are in trouble today, as we speak.

We have a Maui County Water Director who will not listen to the voice of reason. In another place with another commodity I believe this could be construed as criminal negligence. As it is, the power of the County Water Board is outside the real venue of the County Council or Mayor's office. This lack of oversight, caused by the unique nature of water sources and the history of water here on Maui, leaves us open to a future nightmare – one which I believe can be addressed by having the State take over management of the Iao Aquifer, and all sources surrounding this Aquifer which impact it by withdrawing water.

To have your agency take over the Aquifer would also take the tremendous pressure developers have and continue to use on our Council and mayor out of the picture. As this hearing is being held, a major developer, Makena Resort Corp, is asking for zoning to build out over 1,000 new single and multi-family homes and time shares, with another 500 plus room hotel – with another 600 plus acres for future development.

Makena Corp states it is part of a general plan they turned in many years ago, so the Council is obligated to give them the zoning. The rezoning alone will add approx \$150 million to there appraisal value, so they are very motivated. **HOWEVER, THERE IS NO WATER FOR THEM, YET IF IT WERE VOTED ON TODAY, IT WOULD BE APPROVED BY THE MAUI COUNTY COUNCIL.**

When the transmission line from the Iao Aquifer was constructed, you, the State of Hawaii, put up \$4 million of \$11 million of the project. You have shown interest in Maui's water future by supplying such money. Now we are faced with the mismanagement of this resource you helped to build. But even more important than this, you have the mandate and the responsibility as the trustee of all Hawaii's water sources to address such a problem as we face today on Maui. In my research, I came across the following information – which motivated me to contact you today.

In Part 1 of your Administrative Structure of Chapter 174C – State Water Code, it states,”
Declaration of policy.

(a) **It is recognized that the waters of the State are held for the benefit of the citizens of the State. It is declared that the people of the State are beneficiaries and have a right to have the waters protected for their use.**

(b) There is a need for a program of comprehensive water resources planning to address the problems of supply and conservation of water. The Hawaii water plan, with such future amendments, supplements, and additions as may be necessary, is accepted as the guide for developing and implementing this policy.

As the first two lines in this Declaration of Policy, they are the primary guiding elements in your structure. We, the people of Maui, need this protection now, today.

It goes on in your Section 174C-5 General Powers and Duties to state,” The general administration of the state water code shall rest with the commission of water resource management. In addition to its other duties, the commission:

1. Shall carry out investigations into all aspects of water use and water quality. (This is what we believe you are doing now.)

2. **Shall designate water management areas for regulation** after the research and investigations mentioned in paragraph (1), shall consult with the appropriate county council and county water agency, and after public hearing and published notice, **finds that the water resources of the areas are being threatened by existing or proposed withdrawals of water.** (The facts given by USGS and the County of Maui Board of Water Supply support, urge and ask you to do this quickly.)

3. Shall establish an instream use protection program designed to protect, enhance, and reestablish, where practicable, beneficial instream uses of water in the State.”

(CONT'D)

When your level of mandated commitment on the State level is weighed against the purpose statement of the Maui County Department of Water Supply, you can see the difference in the protection afforded by your State Agency.

**RULES AND REGULATIONS OF THE
DEPARTMENT OF WATER SUPPLY**

County of Maui

Section 1-1

Purpose

The unique geographic, geological, and geophysical composition of the county of Maui, when considered in combination with the increasing demand for water, necessitates regulation of the water resources within the county to provide for domestic, agricultural, and commercial needs. These rules and regulations seek to insure a just and fair distribution of water to the people of the county of Maui within the limits of the water resources and systems available. (This has not happened) Preservation and maintenance of water services to existing users without undue reduction in amount of water received or services rendered must be considered in addition to the interest of persons desirous of new water services. It is the purpose of these rules and regulations, therefore, to provide direction, guidance, and procedure for the resolution of problems regarding water service before they arise and to clarify past policies of the department of water supply and the board of water supply of the county of Maui.

Although the County of Maui has assigned themselves the manage Maui's water resources and to resolve problems, this has not been enough of a mandate to insure they would do so. This purpose as listed is not enough to protect us, and does not live up to anywhere near your mandate on the state level.

It is my understanding there have been 4 attempts to gain designation for the Iao Aquifer to be under your jurisdiction. You have over the years given the County of Maui Board and Director of Water Supply many, many chances to restructure and handle the water effectively. They have proven to be poor stewards of this trust – and of our precious resource.

We implore you to finally take the initiative and take over the aquifer. Your mandate states it is necessary. Please do the right thing for the Citizens of Maui. This is not something I ask for lightly, as I am a proponent of home rule. However, I believe in this circumstance it is vital for you to do so.

Thank you for your time,



Sean Lester

Member Institute of Electrical and Electronic Engineers

Member American Society of Mechanical Engineers

Member Hawaiian Organic Farmers Association

Board Member Maui Tomorrow

PO Box 880520
Pukalani, Hawaii 96788

Testimony of *Em Sturtz* (*Maui Advers Neigh. Assoc.,*)
Maui Tomorrow
 KIHEI-WAILEA-MAKENA PROJECTS (revised Jan 8, 2002)

SMA APPROVED PROJECTS		
PROJECT NAME	TMK	UNIT COUNT
Makena Estates (under construction)	2-1-7: 101	40 MF units
MF-21 Subdivision (under construction)	2-3-021:001	7 Ag lots
Palauea - Everett Dowling (site work under construction)	2-1-023: 002	17 SF/Ag lots
Wailea MF-10 Project District	2-1-8: por 103, 121, por 123, por. of 135 and 141	144 MF units
M-35 LLC (Wailea 10)	2-1-8:062	15 SF units
One Wailea Development	2-1-8:115	20 SF lots
Kilohana Mauka	3-9-4: 76, 77 and 78	73 SF lots
Maui Banyan Phase II	3-9-4: 145	343 MF units
Alapiilani	3-9-20:32	48 MF units
Worldmark (constructed)	3-9-20: 20 & 27	200 MF units
Ke Alii Subdivision (under construction)	3-9-18:001	96 SF lots
Landry Apartments	3-9-16: 1 and 7	18 MF units
Elmer & Jacquelyn Valpy	3-9-005: 015	4 MF units
Silversword Golf Estates (note: this project is not in the SMA)	2-2-24: 12 (por) 2-2-24:13 (por)	182 SF lots
Piilani Village	2-2-24: 22 2-2-2: 42 (por)	445 SF units (100 built) (112 under construction) (balance - 233 SF units) 330 MF units (total 563 undeveloped units)

SMA APPROVED PROJECTS		
Kaonoulou Villas	3-9-1: 160, 161, 162, 163	140 MF units
Wailea Beach Villas	2-1-8: 91	104 MF units and one Managers Unit
Kilohana Hema	3-9-04:129	28 SF lots
Kenolio Place	3-9-28: 21	12 SF house/lot package (zero lot line)

Total Number of SF units/lots - 683

Total Number of MF Units - 1372

Pursuant to discussions with the Water Department - **Average** Water Demands for the Kihei-Wailea-Makena areas are as follows:

SF Kihei - 1,000 gpd
 Wailea and Makena - 2,000 gpd

MF Average of all areas - 3-600 gpd

Note: These estimates depend on how the projects handling its site irrigation

LARGE PROJECTS CURRENTLY UNDERGOING THE CHANGE IN ZONING PROCESS

1. Makena Resort - Increment 1 (1105 units plus 545 hotel units = 1650)
2. Wailea 670 - 1400 units

s:\all\ann\kiheiprojectscouncil

Warren Wetanaka



Maui County Farm Bureau

P.O. Box 148

Kula, Hawaii 96790



January 9, 2002

**Testimony before the State Commission on Water Resource
Management Regarding the Designation of the Iao Aquifer**

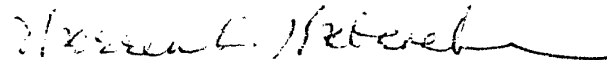
MCFB urges the Hawaii State Commission on Water Resource Management to facilitate Maui County in a proactive position of implementing practices that result in the outcomes desired by designation of the Iao Aquifer. We strongly feel that formal designation alone will not be in the best interest of the County. A designation can lead to a false sense of security that something was done without implementation of action. Emphasis on action rather than designation would stress the focus of the issue.

While seeing negative impacts to agriculture by designation, we see positive collaborative opportunities between agriculture and the County in proactive steps to reduce water use from the Iao Aquifer. Implementation steps accomplish the intent of the designation while, a designation alone without implementation will not result in the desired outcomes. An example is the use of recycled water by agriculture. This practice has not met with the degree of success possible due to the current expectation of having agriculture accept all of the risks and financial burdens associated with its use while other entities pass on these responsibilities and are thereby relieved of addressing the challenges. Agriculture can utilize this water and thereby assist with addressing the designation issue. In so doing, however, it must be a collaborative effort ... if not, agriculture will continue to balk at the idea of having to use recycled water. Assistance in permitting, financial incentives whether through tax or other incentives for infrastructural requirements and other reliefs for monitoring or other regulatory requirements are needed for widespread use. Agriculture is not a high profit margin industry and increased regulatory requirements that cannot be passed on to the consumer make it impossible for the industry to accept full responsibility of use without compensation. If the proper incentives are in place, use of the water would be accepted and thereby significantly contribute to addressing the topic addressed today.

Another area in which agriculture can be of assistance is in conservation practices. We feel that the BWS should be aggressive in promoting conservation efforts. All government entities, organizations and the public need to work cooperatively to bring about success. Changes in County and State rules and policies should be enacted as needed. Our technical expertise in the area of water conservation practices that can be used by landscapers, homeowners and other users of Iao aquifer water will allow Maui to maintain an attractive landscape while reducing requirements. The USDA-NRCS, UH-CTAHR as well as our own Association of Landscape Professionals all can assist in providing information to the public.

We are willing to work with you to reach practical solutions to this challenge. Experiences on Molokai tell us that designation alone does not bring about improvements in water availability. Proactive practices that will make designation unnecessary appear to be a better choice and in the public's interest. Thank you for this opportunity to present our views and we hope to do our part in addressing this challenge.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Warren K. Watanabe", with a long horizontal flourish extending to the right.

Warren K. Watanabe
President, MCFB

Written statement of William Meyer

For the meeting of the
Commission On Water Resources Management

January 9, 2002
Wailuku, Maui

At the Commission On Water Resources Management's (commission) meeting held in Wailuku, Maui on December 9, 1996 the commission's staff recommended designation of the Iao Aquifer as a ground water management area. This recommendation was based on the following considerations: 1) The average monthly pumpage for October, 1996 was 23.3 million gallons per day (mgd) and the 12-month moving average through October, 1996 was 20.8 mgd or 0.8 mgd over the commission estimate for the aquifer's sustainable yield; 2) the average monthly pumpage had increased by about 0.8 mgd over the last year and the Maui Board of Water Supply (BWS) projected annual demand to increase by approximately 0.75 mgd per year; 3) water levels in the Waihee / Waiehu Heights portion of the aquifer had descended to 10 feet above sea level and were beyond the point to which the commission could allow them to go; 4) water levels at shaft 33 were at 7 ft and below the altitude that would allow pumpage (5.5 mgd) to be sustained over the long term without increasing chlorides; 5) water levels in the aquifer were continuing to decline, and the midpoint of the transition zone between freshwater and saltwater (the freshwater-saltwater interface) had risen more rapidly in the last year; 6) pumpage in the Iao aquifer was causing water level declines in the North Waihee wells in the Waihee Aquifer System and proposed pumpage from the Waihee Aquifer may further affect Iao Aquifer water levels.

The staff's recommended course of action was based on the conclusion that hydrologic conditions in the aquifer in 1996 indicated that the long-term reasonable-beneficial use of the aquifer was threatened.

The commission decided against the staff's recommendation however, and on August 13, 1997 voted not to designate the Iao Aquifer System. Although not designated, the commission added the condition that if the 12-month moving average of pumpage from the aquifer ever exceeded 20 mgd, the aquifer would be automatically designated. Because water levels had declined beyond the point that was allowable and because the midpoint of the transition was rising rapidly, the commission's decision was apparently based on the belief that a reduction in the rate of ground water withdrawal to or below sustainable yield would result in an improvement in hydrologic conditions in the Iao Aquifer to the point that the long-term threat to the water source indicated by the altitude of the water levels in the aquifer and their continuing decline with time and by the continuing rise in the transition zone would be removed.

This has not happen however. Although the 12-month moving average for pumpage from the aquifer moved below 20 mgd in 1997 and has remained below this value to the present time, conditions relative to all of the other concerns expressed by the commission staff in 1996 have only worsened. Water levels are everywhere lower now than in 1996 and have declined to levels that all four of the BWS well fields are now subject to unacceptable levels of saltwater intrusion, the transition zone is higher and continues to rise, the chloride content of pumped water has increased in all of the well fields indicating that wells in the four major well fields are experiencing varying levels of saltwater intrusion, high chloride content has forced cessation of pumping from Mokuahau pump 2 and is forcing a reduction of usage for one of the two well in the Waiehu Heights well field (pump 1). Chloride content of water pumped from Mokuahau pump 1 has reached the United States Environmental Protection Agencies (EPA) recommended limit of 250 milligrams per liter (mg/l) during the last year as has that of water pumped from Waiehu Heights pump 1, water levels in the Waihee Aquifer have continued to decline and pumpage from the North Waihee well field has caused water level declines in the Iao Aquifer and vice-versa.

These conditions indicate that the long-term stability of the aquifer is still threatened and because hydrologic conditions in the aquifer are worse now than they were in 1996, the existing threat is greater than it was in 1996 when the staff recommended designation. Despite worsening conditions since 1996, the commission's staff has reversed itself, recommending denial of the Maui Meadows Homeowners Association's petition at the commission's meeting on November 14, 2001.

In their submittal for the November 14, 2001 commission meeting, the staff suggest that *"overall, the Iao Aquifer System situation remains the same as it was in 1997"*, when the commission acted on the information provided in 1996. Given the continuing decline in hydrologic conditions since 1996, this is clearly not the case. In addition, the United States Geological Survey has published two reports (WRI-00-4223 and WRI-00-4244) that discuss the Iao Aquifer since 1996 and that provide a conceptual framework in which to consider existing conditions in the aquifer.

The first USGS report indicates that the sustainable yield of the Iao Aquifer is less than 20 mgd if existing infrastructure is to be protected. It also states that the Iao Aquifer is part of a larger regional ground water system because the rocks that comprise the aquifer extend beyond the geographic boundaries of the aquifer. The second report discusses the methodology used by the commission to determine sustainable yield i.e., the RAM model. This report concludes that inherent limitations in the RAM model will cause it to under-predict water level declines in Hawaii's aquifers, with the greatest error in prediction occurring at the sites of ground water withdrawal. This limitation will cause the RAM model to over-predict sustainable yield and will leave pumping locations vulnerable to saltwater intrusion. These conclusions describe the existing situation in the Iao Aquifer at this time. The limitations of the RAM model result from its inability to represent spatial variables that actually control the decline in water levels in an aquifer in response to ground water pumping. These variables include spatially varying hydraulic properties of an aquifer and the spatial configuration of wells. The USGS report

demonstrates that the error inherent in the RAM model is exacerbated for hydrologic settings consisting of a basal aquifer overlain by a “caprock”, which is the setting for the Iao Aquifer.

As part of their November 14, 2001 submittal, the commission staff identified and discussed five main issues raised in the Maui Meadows Homeowners petition as follows.

- 1) Evidence from the USGS reports show that the Iao aquifer sustainable yield is less than 20 mgd and the Waihee Aquifer System does not add additional sustainable yield.
- 2) Alternative well sources in the Waihee Aquifer System do not constitute sufficient spreading of the pumping to relieve stress on the Iao Aquifer System.
- 3) Chloride concentrations from the Waiehu and Mokuahau wells are rising significantly faster.
- 4) Water levels are at record lows despite lower pumpage and not because of the 4-year drought.
- 5) Development pressure from the Central Maui Source Joint Venture and continued approval of water meters for development within and outside of the Iao Aquifer System is placing greater reliance on the Iao Aquifer System.

Discussion on the staff’s submittal for the November 14 commission meeting

Issue 1) Evidence from the USGS reports show that the Iao aquifer sustainable yield is less than 20 mgd and the Waihee Aquifer System does not add additional sustainable yield

The Water Code’s definition of sustainable yield is that it is “*the maximum rate at which water may be withdrawn from a water source without impairing the utility or quality of the water source as determined by the commission*”. Because, as pointed out by USGS report WRI-00-4223, the amount of water that can be developed from an aquifer is constrained by the spatial distribution of wells in the aquifer, development of water from an aquifer at the maximum rate would require optimizing well location.

There is only one configuration of wells that would result in the ability to maximize ground water production. Any other configuration will result in less water being available. Optimizing well location is not part of the commission’s approval process for well installation however, instead, well installation is selected by the potential owner. As a result the maximum rate of water withdrawal from Hawaii’s aquifers (sustainable yield) cannot be realized.

The staff, while agreeing with the USGS, that well configuration constrains the amount of water that can be developed from an aquifer, states in its November 14, 2001 submittal

that sustainable yield as determined in the commission's Water Resources Protection Plan (WRPP) *"is the maximum rate at which water can be withdrawn based upon an optimal spacing of wells, which is a critical assumption of the analytical RAM model used for all sustainable yields in the WRPP"*. They further state *"if the full sustainable yield were withdrawn from too few sources, localized effects would reduce the length of time those sources can be used"* and that this is the current situation in the Iao Aquifer. They conclude in part that *"localized upconing effects undoubtedly affect concentrated pumping"* in the Iao Aquifer, but *"this can be remedied by optimizing well distribution in both the horizontal and vertical directions"*. The staff further states that existing hydrologic conditions at the BWS well locations do not mean *"the entire Aquifer System is in imminent danger"*.

Although the staff states that sustainable yield as determined in the commission's Water Resources Protection Plan (WRPP) is based upon an optimal spacing of wells this statement is not to be found in the WRPP and as discussed, it is not internally consistent with the commission's approval process for well installation. For instance, in a non-management area the commission only requires that the proposed use of the water is reasonable, after which, they require a limited pump test at the proposed well site to establish that the desired amount of water is available. The approval process also considers the existing rate of withdrawal from the aquifer relative to the WRPP sustainable yield value for the aquifer in order to make sure that sustainable yield is not being exceeded. No routine discussion or consideration is given to optimizing well location.

As part of their consideration of the potential affect of ground water withdrawals from the Waihee Aquifer on the Iao aquifer the staff states that the WRPP management scheme of aquifer systems and sustainable yields *"is a simple and rough way of spreading the pumpage to optimize and prevent concentrating pumpage in fewer locations"*. This statement probably best expresses the extent of the commission's routine efforts to institute a program for spatially distributing wells. But implementing a *"simple and rough"* method for distributing pumping is not even remotely the same thing as optimizing well locations. As stated above, there can only be one configuration of wells that will result in an optimal distribution. Any other distribution of wells is less than optimal and will result in less water being available.

By maintaining a system that presumably determines sustainable yield for an optimized distribution of wells and not specifying and requiring this distribution while at the same time allowing the rate of ground water withdrawal to approach or reach the WRPP value of sustainable yield, the WRPP management scheme employed by the commission is, in reality, a trial and error process that will eventually create unacceptable hydrologic conditions in an aquifer identical to those now existing in the Iao Aquifer.

It is a management scheme that will result in saltwater intrusion into some or all of existing sources when the rate of ground water withdrawal exceeds the ability of the existing infrastructure to sustain this withdrawal. The WRPP management scheme cannot predict the rate of withdrawal at which this will occur however, leaving wells vulnerable

saltwater intrusion even before a withdrawal rate equal to sustainable yield is reached as is the case in the Iao Aquifer.

Once pumping begins, water levels and chloride content of pumped water become the basic criteria available to evaluate sustainable yield, and this evaluation becomes localized to existing infrastructure as exemplified by the current situation in the Iao Aquifer. Under these circumstances, the commission's only course of action for correcting low water levels and high chlorides is to reduce the rate of ground water withdrawal to a point that water levels will recover to an altitude sufficient to protect existing sources on a long-term basis. This is management by reaction rather than by appropriate planning.

Notwithstanding the staff's statement to the contrary, technical questions exist as to whether sustainable yields determined by the RAM model are actually based on an optimized distribution of wells. As stated, this requirement is not to be found in the WRPP and it is not part of the established routine or process for well approval based upon the WRPP management scheme. The WRPP does not discuss nor specify an optimal distribution of wells for any aquifer in the state.

The statement that RAM sustainable yields are based on an optimal spacing of wells is also not consistent with statements made on limitations of the RAM made by the developer of the model, Mr. John Mink. Mr. Mink states in correspondence to Mr. Gordon Tribble (USGS District Chief of the Water Resources Division's Hawaii District) dated February 2, 2001 that "*RAM is a simple horizontal flow model that treats the aquifer as a single cell.*" This statement clearly demonstrates that RAM cannot evaluate spatially distributed parameters, such as well location or the hydraulic properties of aquifers that, as discussed above, actually control the decline of water levels in an aquifer induced by ground water withdrawals. Given this, it is not possible for sustainable yield derived from the RAM equation to be based on an optimal spacing of wells as stated by commission staff. Mr. Mink states further in his letter to Mr. Tribble that "*Ram does not deal with local effects, such as individual well pumpage*".

Despite these contradictions, the conclusion in USGS report WRI-00-4244 that RAM will over-predict sustainable yield and under-predict water level declines induced by ground water withdrawals with the greatest error at sites of withdrawal still means that the WRPP management scheme is a trial and error process with the degree of error unknown in the absence of numeric modeling. It remains a process that leaves wells vulnerable to saltwater intrusion and is a process that, at some unknown point will result in unacceptable hydrologic conditions in an aquifer identical to those now existing in the Iao Aquifer.

The situation that has occurred in the Iao Aquifer since 1996 to the present time and the commission's 1997 decision seemingly would have resulted in the commission staff documenting the rate of ground water withdrawal from the aquifer on a continuing basis. The staff identifies eight sources in the Iao aquifer, but have records for only the BWS. These latter records are actually maintained by the USGS in cooperation with the BWS. Apparently, commission staff has made no effort to record water use from other sources

in the aquifer, a situation that requires immediate attention and correction. Also, USGS report WRI-00-4223 indicates that the basal part of the Iao Aquifer lies within the volcanic and the overlying sedimentary rock, but the staff states that pumpage from the sedimentary deposits should not be counted as pumpage from the Iao Aquifer. This conclusion is not consistent with the actual hydrologic setting of the aquifer and ignores the point that the sedimentary rocks are not identified as a separate aquifer in the WRPP. Pumpage from the sedimentary deposits should be counted as part of ground water withdrawal from the Iao Aquifer.

Although pumping from the Iao aquifer has been reduced since 1996, pumping has been initiated in the Waihee Aquifer at the North Waihee and Kanoa well fields located near the geographic boundary between the two aquifers. The 12-month moving average pumpage from these two fields through September 2001 was 3.94 mgd and the combined pumping from the Iao aquifer and these two well fields was 21.42 mgd. The average rate of withdrawal from the well fields in the Waihee aquifer has increased over time and the BWS plans to develop another two wells in the aquifer. There is no disagreement that pumping from the Waihee Aquifer causes water levels in the Iao Aquifer to decline and vice-versa. This decline reduces ground water availability in each aquifer below that predicted by the state's methodology for determining sustainable yield. This was a major concern to commission staff in its 1996 submittal for designation of the Iao Aquifer.

In considering the relationship between the Iao Aquifer and the Waihee Aquifer, the staff concludes that the Waihee aquifer System is a separate, but not independent, hydrologic unit from that of the Iao Aquifer System. According to staff, the issue raised by the Maui Meadows Homeowners Association concerning the Waihee Aquifer is whether pumpage from the Waihee Aquifer should be counted against that system or against the Iao Aquifer. They conclude that, although the wells in the Waihee Aquifer are close to the boundary between the Waihee and Iao aquifers, these wells *"are spreading pumping on a regional scale and should be counted against the Waihee Aquifer System Sustainable Yield."*

The statement that the Waihee Aquifer System is a separate, but not independent hydrologic unit (from the Iao Aquifer System) makes sense only if it is recognized that hydrologic stresses such as pumping in one system can cause water level declines in the other. This was an issue of considerable concern to the staff in its 1996 submittal and it is the real issue today. The issue is not which aquifer pumpage from the Waihee Aquifer should be counted against or assigned to. Field data collected since the early 1990s to the present time clearly indicate that pumping from either aquifer induces water level declines in the other. Thus the conclusion made by the staff that the pumpage from the Waihee Aquifer should be counted against that aquifer overlooks the main issue, i.e., the decline in water levels induced in the Iao Aquifer by pumping in the Waihee Aquifer and the attendant reduction in the sustainable yield of the Iao aquifer as a result. Pumping from the Iao aquifer also has the same affect on the Waihee aquifer. Assigning pumpage to the Waihee Aquifer without considering its affect on the sustainable yield of the Iao aquifer and vice-versa doesn't make hydrologic sense given that the staff accepts that the two aquifers are not hydrologically independent entities.

Issue 2) Alternative Water Sources in Waihee

The staff expresses some concern here about the need to optimize ground water withdrawal in the Waihee Aquifer so that the BWS does not set *“itself up to a constrained optimal development of sustainable yield similar to lao in terms of well configuration.”* The staff seems particularly concerned that the BWS will concentrate withdrawal near the lao – Waihee boundary indicated that such concentration *“is not a wise idea.”*

These statements seem to reconfirm the staff's understanding of the importance of optimal well configuration in determining ground water availability. They also appear to confirm the staff's recognition the ground water withdrawals from the Waihee Aquifer will lower water levels in the lao Aquifer thereby reducing sustainable yield of the later aquifer.

Issue 3) Rising Chlorides in Waiehu Heights and Mokuahau Wells.

The staff begins this discussion with the statements that *“Chlorides have increased in the Waiehu Heights and Mokuahau Wells (Exhibit 14) but have remained relatively stable in the other wells. This is to be expected, as the problem wells also happen to be the deepest wells.”* These statements are not correct on the surface and one would wonder why chloride problems are *“expected”* anywhere, unless the aquifer is being over-pumped.

The deepest wells in the lao aquifer are the Waiehu Heights well 1 at -338 ft below sea level and the Shaft 33 well at -280 ft below sea level. The two Mokuahau wells are at -247 and -251 ft. Chlorides have increased at all well field since 1996, although the greatest increase has been at the Mokuahau and Waiehu Heights wells and water at Waihee and Shaft 33 is still very good. Regardless, increasing chlorides indicate that saltwater intrusion is occurring at all of the well fields although at varying degrees. The chloride content of water pumped from Waiehu Heights 1 and Mokuahau 1 reached 250 mg/l, the EPA's recommended limit for domestic water during 2001.

Rising chlorides have resulted in the BWS indicating that pumping at Waiehu Heights 1 will be reduced and has resulted in pumpage from Mokuahau 2 being stopped altogether in 1996.

The staff states that the current rise in the top of the transition zone is 1 ft per year, which is less than the 10 ft per year that the staff was concerned with in 1996. This is not an accurate statement. The midpoint of the transition zone was rising at an average rate of 10 ft per year in 1996, not the top of the transition zone. No value was stated for the rate of movement of the top of the transition zone in the staff's 1996 submittal. The USGS stated on November 14, 2001 that the average rate of rise in the transition zone hasn't changed.

Finally the staff states that *“although it may take decades for the top of the transition zone to reach all wells from an aquifer standpoint, there will be localized chloride problems long before that due to (localized) upconing (Exhibit 12).”* This is a clear recognition that conditions in the Iao Aquifer are deteriorating over time and, given existing conditions, sources of water are threatened with saltwater intrusion.

Issue 4) Water levels and Drought

The staff states that they *“and the USGS concur that a severe 4-year drought has occurred since 1997 although it appears to be nearing its end (see Exhibit 15).”* They go on to state that *“the drought could be a significant cause of current water level declines.”* They later state that *“if the current drought conditions abate, there should be an even greater recovery of water levels in the aquifer and at individual wells.”*

There is no question that the Iao Aquifer area has undergone a drought since 1997 and that an abatement of the drought conditions will improve hydrologic conditions in the aquifer. The staff does not indicate that conditions would improve to the point that the aquifer is no longer threatened however, and the record does not support such a contention in any case. Hydrologic conditions in the Iao aquifer in 1996 were of sufficient concern to cause the staff to recommend designation of the Iao Aquifer at that time and this was one year before the drought took affect. It was clear then that the rate of ground water withdrawal had to be reduced from a rate nearly equal to sustainable yield, but no one at the time knew how great a reduction was required. It would seem irresponsible to allow the rate of withdrawal to once again approach sustainable yield even if and when the drought abates.

Issue 5) Increased Reliance on Iao from continued BWS allocations.

The staff's discussion of this subject is somewhat vague in its conclusions. They recognize that the future authorized use of water from the Maui Water Use and Development Plan 1990 cannot be met by the Iao Aquifer, but only suggest that future plans to increase pumping from the Iao Aquifer above present use *“may not be prudent”*. They then go on to identify Iao Stream as a potential source of water, but state that *“a quantified IIFS would need to be set.”* They also recognize that the Supreme Courts Waiahole decision casts a new perspective on potential use of stream water.

Given that the BWS letter of 9/26/01 indicates a desire on their part to increase withdrawal from the Iao Aquifer to 90 percent of the commission's estimate of sustainable yield and increase withdrawal from the Waihee Aquifer to 100 percent of its estimated yield, the staffs discussion of this issue seems weak.

The existing situation in the Iao Aquifer indicates that the rate of withdrawal from the aquifer should be reduced, not increased. The affect of existing withdrawals at the North Waihee and Kanoa well fields on water levels in the Iao Aquifer will only grow worse over time and the addition of more pumpage will only exacerbate this situation. The staff makes no comment with regard to the reliability of the WRPP sustainable yield value for the Waihee Aquifer in this section, but provide conflicting statements elsewhere. On the one hand the staff states that it is "*confident in its current sustainable yield estimate of 8 mgd*" but it has also employed a consultant to re-evaluate this value. Staff also states under Issue 2, that unless pumpage is optimized in the Waihee Aquifer, optimal development of that aquifer will be "*constrained*" in a manner similar to Iao in terms of well configuration. Staff completely ignores conclusions of USGS report WRI-00-4244 concerning sustainable yield values determined from the RAM model.

Discussion of Staff's Summary and Conclusions

The summary once again states that overall; conditions in the Iao Aquifer are the same as they were in 1996. This is clearly not the case. Conditions have worsened and this is supported by the staff's own discussion of the issues they indicate were raised by the Maui Meadows Homeowners Association petition.

Staff states that they are concerned about recent chloride increases in Waiehu 1 and Mokuahau wells, but believes that continued monitoring and construction of an additional deep well in the southern Iao will provide additional management tools. It should go without saying that continued monitoring will not improve existing conditions. Abatement of the drought can be expected to improve conditions to some degree, at least for the short term, but the historical record clearly indicates that 20 mgd is not available from existing infrastructure and the current record suggests that even 17 mgd may not be available even when the drought abates. The problems in the Iao Aquifer are in the northwestern part of the aquifer, not in the southern part where pumping wells don't exist. Although construction of monitoring wells is always a good idea and useful in the long term, construction of such a well in the southern part of the Iao Aquifer at this time will do little or nothing to resolve existing problems.

Staff also states that rate of rise of the transition zone (as evidenced by the movement of the transition zone in the Waiehu deep monitor well) indicates that there is time to optimize well configuration in the Iao Aquifer to realize the 20 mgd sustainable yield. Staff had previously made several statements that contradict this summary statement however. In the first place staff had stated that localized chloride problems from upconing will occur "long before" (and in fact are occurring now) the top of the transition zone reaches all wells. They qualify this conclusion by stating that "*these rates of increases are no different than that observed by the commission back at its August 13, 1997 decision.*" As indicated by the USGS quarterly reports of chloride concentration in pumping well in the Iao Aquifer and by data provided later in the statement, the staff's conclusion cannot be supported. Chloride concentrations are worse now than in 1997.

Finally, the staff had previously recognized the requirement or need to construct a numeric model to optimally locate wells, but later in their summary statement state that construction of such a model represents an enormous task in terms of time and money. The staff states that they have a lack of funds to undertake this work and does not require such an effort from the BWS. In effect, the staff's statement that there is time to optimize well configuration before unacceptable increases in the chloride content of pumped water occurs has no practical value.

Staff's recommendation that the commission deny the continuance of the petition to designate both the Iao and Waihee Aquifer Systems is in direct contrast to their 1996 submittal regarding designation of the Iao Aquifer, although hydrologic conditions in the Iao Aquifer have only worsened since 1996. If approved, the recommendation would have also allowed a less than optimal development for wells in the Waihee Aquifer thereby reducing its sustainable yield by some unknown amount.

Staff's recommendation to continue the commission's August 13, 1997 decision to designate the Iao aquifer should the 12-month moving average (of pumpage) reach 20 mgd would allow the rate of withdrawal from the aquifer to increase in the face of existing conditions that, in and of themselves, significantly threaten the long term stability of the Iao Aquifer, thereby increasing the threat and the severity of any future action to correct the situation.

Supporting Data

Average annual rates of ground water withdrawal from the Iao Aquifer have been below 20 mgd since 1996 when the rate was at 20.35 mgd, 0.35 mgd over the commission's estimate for the sustainable yield of the aquifer (table 1). Rates have ranged from 16.90 to 19.11 or from 85 percent to 96 percent of sustainable. The 12-month moving average through September 2001 was 17.48 mgd, 87 per cent of sustainable yield.

Table 1. Average annual pumpage from the Iao Aquifer and the 12-month moving average through September 2001.

Well field	1996	1997	1998	1999	2000	2001 (through Sept. 2001)
Waihee	8.22	8.94	9.11	9.22	4.98	4.99
Waiehu Heights	1.56	1.23	0.23	1.10	1.46	1.49
Mokuhau	5.13	6.30	3.21	4.62	4.74	5.04
Shaft 33	5.16	1.84	4.84	2.84	4.81	5.11
Kepaniwai	0.28	0.80	0.51	0.70	0.91	0.84
Subtotal	20.35	19.11	17.89	18.48	16.90	17.48

Ground water withdrawal from the North Waihee well field began in 1997 and the average annual rate of withdrawal increased from 0.70 mgd in that year to 3.2 mgd in 2000 (table 1a). The 12-month moving average through September 2001 was at 2.68 mgd. Pumpage from the Kanoa well field began in 2000 and the combined 12-month moving average pumpage from the North Waihee and Kanoa well fields was 4.11 mgd in 2000 and 3.94 mgd through September 2001.

Table 1a. Average annual pumpage from the North Waihee and Kanoa well fields in the Waihee Aquifer and the 12-month moving average through September 2001.

Well field	1996	1997	1998	1999	2000	2001
N. Waihee	---	0.70	1.81	2.42	3.20	2.68
Kanoa	---	---	---	---	0.91	1.26
Subtotal	0.0	0.70	1.81	2.42	4.11	3.94
total	20.35	19.81	19.7	20.90	21.01	21.42

Table 2 shows intrusion water levels and mean annual water levels at pumping locations in the basal part of the Iao Aquifer and the North Waihee well field for 1996 and for the year October 2000 through October, 2001. Intrusion water levels are the water level associated with the intrusion of saltwater containing chloride content greater than 250 mg/l assuming that the thickness of the transition zone above the freshwater-saltwater interface is 175 ft. USGS report WRI-00-4223 states that this thickness is between 100 to 175 ft. The 175-ft assumption is therefor conservative.

As can be seen from table 2, 2001 water levels are everywhere less than 1996 water levels, but both sets of water levels in the Iao Aquifer are below intrusion water levels. The 2001 water level at Waihee well field is more than 0.4 ft below the intrusion water level. The water levels at Waiehu Heights is 3.8 ft below. The 2001 water level at Mokuahau and Shaft 33 are 4.8 and 3.1 ft below intrusion levels respectively. The 2001 water level for the North Waihee well field provides only an insignificant margin of safety.

Table 2. Intrusion water levels and mean annual water levels at pumping locations in the basal part of the Iao Aquifer and the North Waihee well field for 1996 and for the year October 2000 through October, 2001.

Well field	1996 water level	2001 water level	Intrusion water level	comments
Waihee	8.9	< 8.5	8.9	Well field intruded
Waiehu Heights	9.4	-- 9.0	12.8	Well field intruded
Mokuahau	10.0 (1998)	5.8	10.6	Well field intruded
Shaft 33	10.2	8.3	11.4	Well field intruded
N. Waihee	8.0	7.3	7.0	Well field marginally safe

Table 3 compares "safe water levels" for well fields in the basal part of the Iao Aquifer and the North Waihee well field submitted by commission staff on November 14, 2001 to

intrusion water levels discussed above. The safe water levels are water level associated with the intrusion of saltwater containing chloride content greater than 250 mg/l assuming that the thickness of the transition zone above the freshwater-saltwater interface is 100 ft. rather than 175 ft. As a result safe water levels are lower than intrusion water levels. Given conclusions regarding the thickness of the upper part of the transition zone discussed by the USGS, an assumption of 100 ft for this parameter is a non-conservative assumption.

Table 3. Comparison of "safe water levels" for the well fields in the basal part of the Iao Aquifer and the North Waihee well field submitted by commission staff on November 14, 2001 and intrusion water levels.

Well field	Safe water level	Intrusion water level	2001 water level
Waihee	7.0	8.9	< 8.5
Waiehu Heights	11.0	12.8	~ 9.0
Mokuhau	8.8	10.6	5.8
Shaft 33	9.5	11.4	8.3
N. Waihee	5.1	7.0	7.3

Background chloride content of water in the Iao and Waihee Aquifers is in the neighborhood of 20 mg/l or less. As a result, chloride content of pumped water in excess of this can be assumed to represent some degree of saltwater intrusion. As shown in table 4, all of the well fields in the Iao Aquifer have experienced some amount of intrusion, but water is still very fresh at Waihee and Shaft 33 in the Iao Aquifer and at the North Waihee well field. Pumpage at Mokuhau 2 stopped in 1996, but chloride content of water from this well field has increased over time and at Waiehu Heights also. Chloride content of pumped water from both well fields has reached 250 mg/l within the last year; the EPA recommended limit for domestic water. According to a letter from the BWS to the commission dated September 10, 2001 the BWS anticipates reducing the withdrawal rate from the Waiehu deep well in order to reduce the chloride content of water.

Table 4. Annual range in chloride content of pumped water from pumping locations in the basal part of the Iao Aquifer and the North Waihee well for 1996 through 2000 and for 2001 through October.

Well field	1996	1997	1998	1999	2000	2001
Waihee	30 / 40	15 / 55	45 / 70	55 / 70	40 / 70 reduced pumping	40 / 55 reduced pumping
Waiehu Heights	45 / 160	50 / 130	60 / 100 reduced pumping	50 / 190	50 / 220	70 / 250
Mokuhau	40 / 450 Mokuhau 2	50 / 195	60 / 170	50 / 210	130 / 240	100 / 250
Shaft 33	35 / 45	35 / 40	35 / 45	40 / 48	40 / 55	40 / 55
N. Waihee			17 / 20	17 / 21	17 / 25	19 / 20

Hydrologic conditions in the basal part of the Iao Aquifer in terms of pumpage, chloride content, and mean water levels for 1996 are compared to these variables for 2001 in table 5. As discussed previously, 2001 chlorides are higher than those in 1996, and 2001 water levels are everywhere lower despite a reduction in the rate of withdrawal from the aquifer of 17 percent. 2001 pumpage at the Waihee well field is 39 percent less than it was in 1996, but even so, water levels are lower and chlorides are higher. Given the close proximity of the Waihee well field to Waiehu Heights, it is highly probable that the chloride content of water from the latter well field would have exceeded 250 mg/l had the rate of ground water withdrawal from the Waihee well field not been reduced. It is also evident from the table that had 2001 pumpage rates remained equal to those of 1996, conditions in the Iao Aquifer would have been much worse than they actually were.

Table 5. Mean annual pumpage, water levels and the range in chloride content of pumped water, 1996 and for 2001 through October.

Well field	1996 pumpage	1996 chlorides	1996 water levels	2001 pumpage	2001 chlorides	2001 water levels	Intrusion water levels
Waihee	8.22	30 /40	8.9	4.99	40 /55 reduced pumping	< 8.5	8.9
Waiehu Heights	1.56	45 /160	9.4	1.49	70 /250	~ 9.0	12.8
Mokuhau	5.13	40 /130	10.0 (1998)	5.04	100 /250	5.8	10.6
Shaft 33	5.16	35 / 45	10.2	5.11	40 / 55	8.3	11.4
total	20.07			16.63			
North Waihee	---	---	8.0	2.68	19 / 20	7.3	7.0

Scientific Uncertainty

USGS report WRI-00-4223 states that the sustainable yield of the Iao Aquifer is less than the commission's estimate of 20 mgd if existing infrastructure is to be protected. This conclusion is based on the state of water levels in the aquifer during 1996, when the rate of ground water withdrawal was 20.35 mgd, 0.35 mgd over sustainable yield. USGS report WRI-00-4244 goes further and states that the WRPP method used by the commission for determining sustainable yields over-estimates the value and under-estimates water level declines associated with pumping. As a result, the WRPP leaves wells vulnerable to saltwater intrusion. These findings are confirmed by the existing situation in the Iao Aquifer.

By definition an optimal distribution of wells is required in an aquifer in order to be able to withdraw an amount of water equal to sustainable yield, yet this distribution is not

identified or specified in the WRPP management scheme and the commission has no routine practice in place to obtain or require it. In practice, well locations are generally selected by their potential owners based on land ownership considerations. Because wells are not optimally located, it is not possible to obtain sustainable yield values stated in the WRPP and the lesser amount of ground water available cannot be determined from WRPP methodology.

The WRPP states and most hydrologist agree that Aquifer Systems established in the WRPP are not independent from adjacent aquifers and, as a result, ground water withdrawals from one system will lower water levels in the other, thereby lowering sustainable yield in the affected aquifer. Still, this fact is ignored by the WRPP management system. For instance, despite the acknowledged fact that pumpage from the Waihee Aquifer is causing water levels in the Iao Aquifer to decline and vice-versa, the commission staff still states that the WRPP sustainable yield from each aquifer is available.

With the exception of the WRPP and the writings of its author, nearly all other technical and field considerations available to the commission point to the fact that the amount of water that can be developed from an aquifer will be less than that specified in the WRPP. As a result, continuing to manage the state's ground water resources with the WRPP management scheme reduces this management to a trial and error process with the degree of error unknown in the absence of numeric modeling. It is a process that leaves wells vulnerable to saltwater intrusion and is a process that, at some unknown point will result in unacceptable hydrologic conditions in an aquifer identical to those now existing in the Iao Aquifer. Ultimately hydrologic conditions will require a reduction in pumping with the amount of reduction dependent on the severity of the problem.

Given the above consideration, it is evident that continued management of the state's ground water supplies using the WRPP system of management is inconsistent with the Hawaii Supreme Court's decision on the requirements associated with the Public Trust Doctrine. This doctrine requires the commission to include scientific uncertainty in its management process and in the face of uncertainty to err on the side of protection of the resource.

Testimony of James Williamson
State Commission on Water Resource Management
Public Hearing on Designation of Iao Aquifer
January 9, 2002

Good Evening:

My name is James Williamson. I represent Maui Meadows Homeowners Association which is the petitioner for designation of the Iao Aquifer.

I. CONDITION OF IAO AQUIFER SINCE 1997

In its submittal at the Commission hearing last November 14, the CWRM staff continually stressed that the condition of the aquifer had not changed since designation was last contemplated in 1997. We have extracted a number of illustrations from the latest USGS data report (P/E 9/30/2001) to show that there has been a marked deterioration of the condition of the Iao aquifer over the approximately last five years.

a. Pumpage

Exhibit A shows that pumping from the Iao aquifer proper has indeed been reduced from 21.0 mgd in 1996 to 17.5 mgd. The total system pumpage, including the Waihee wells is now 22.0 mgd with 4.5 mgd coming from those wells. We maintain that there is a direct connection from Waihee to Iao, so that the total Iao aquifer pumpage has not reduced but actually increased by some 10%.

b. Water Levels

Exhibits B and C show that despite the reduction in pumping from the Iao defined portion of the aquifer system, water levels in the various test holes continue to fall to their lowest levels ever. Exhibit D shows that the water level in Shaft 33, during pumping, has dropped from 11 feet to an unprecedented 7.83 feet. This general fall in water levels has been consistent since 1990-91.

c. Saltwater Intrusion

Exhibit E shows that the chloride concentration in Shaft 33 pumpage is in the very satisfactory range of from 40 to 60 ppm, well within the limit of 250 ppm set by the Department of Health. However, as shown on Exhibits F and G, the chloride concentrations in the Mokuahau and North Waiehu well systems are currently in the range of 200 to 250 ppm. In fact Mokuahau pump No. 2 had chloride concentrations of between 400 and 500 ppm before it was shut down in 1996, and it has not been operated since. The graphs show that despite a general decrease in pumping over the last five years at both well systems, there has been a consistent increase in salt levels. Last year, and probably this year, salt concentrations over a three month period were in the range of 160 to 180 ppm, which should have triggered notice of low ground water

conditions under the Board of Water Supply's Iao Management Rule. Still the Department of Water Supply continues to mix this salty water with fresh water, and so supplies water to its customers which is less than better quality. This method of significant dilution is a questionable practice for a water -supply utility. Pumpage from Mokuahau and North Waihehu is some 40% of the total Iao output, a substantial portion. Upconing has no doubt contributed to the high salt levels in these well systems. Hence rather than the assumed 600 to 650 feet of freshwater available to be mined, a more prudent average estimate is 250 to 300 feet. This depth is being diminished day by day, as shown in Exhibit H by the increasing level of the mid point of the transition zone below the fresh water lens. It has risen 40 feet in 5 years, or 8 feet per year on the average. This increase shows no sign of abating.

II. GENERAL COMMENTS

My general comments follow:

a. Hundreds of water meters have been issued for potential future connections of about 10 mgd, by one estimate, about one half of the aquifer's present output. We wonder just how many meters are outstanding and how much water is represented by them. At the same time the County Planning Department/Planning Commission, continue to approve developments in south Maui without any knowledge of the availability of good quality potable water and the impact on those of us who already live here.

b. Spreading pumping is advisable but it won't change the ultimate impact of over-pumping the aquifer. As a first priority, a new well field must be developed at a location 3 to 4 miles north of the aquifer, so that aquifer pumping can be reduced. Once these wells are functioning the DWS can then considering fussing with further well redistribution. This latter effort will be costly and could well result in reduced output from the aquifer. Continued monitoring is an unacceptable solution, the time for "wait and see" is past, now is the time for positive action.

c. Once saltwater intrusion occurs it is irreversible, at least for a period of years, and the principal source of water supply for central and south Maui will be lost.

d. In our view the principal steps which need to be undertaken promptly to protect this aquifer are as follows:

- (1) Designation as a State groundwater management area so that overall management can be applied
- (2) BWS to enforce the conditions of its own Iao Water Management Rule
- (3) BWS to adopt a temporary moratorium on the issuance of water meters, and connections to the DWS system, until steps (4) and (5) are complete

- (4) Develop a production well system in the north Waihee-Kahakuloa aquifers, at least three or four miles north of the Iao boundary
- (5) Drill an additional deep monitor well in the south part of the aquifer

III. IAO WATER MANAGEMENT RULE

As discussed previously BWS is not enforcing its own management rule for the aquifer. Last year, and probably this year, two of the well systems reached a status of at least caution, and maybe alert, low ground water condition. BWS not only did not inform governmental agencies, but also did not inform the public and appeal for water conservation and institute voluntary schedules for water reduction. Mandatory restrictions would be applied if an alert groundwater condition exists. This demonstrates that the County appears reluctant to enforce its own management rule to protect the very important Iao aquifer system.

IV. DWS PRACTICE FOR PLANNING AND FINANCING SOURCE DEVELOPMENT

The methods used by the Department of Water Supply for planning and financing major source development are completely unsatisfactory. They have resulted in a history of never providing a long-term adequate water supply for upcountry and central and south Maui. Simply put there is no credible plan. Water supply needs are met by reactive, not proactive, solutions.

For example, when the central Maui joint venture agreement was signed more than 25 years ago, the DWS relaxed and did nothing to augment supplies except drill a few wells in the Iao aquifer. As a result, by 1996 the situation in the aquifer was so bad that CWRM threatened to designate it and take over its management. This was averted when the BWS promised to develop another water source in the adjacent Waihee aquifer "at some distance" north of the Iao aquifer. However, DWS again limited expenditures by drilling the new wells very close to the Iao boundary so that pumping from them is in an extension of the Iao aquifer, and again it is obvious that Iao is being threatened.

Upcountry the BWS has just rescinded the drought emergency. Comes next summer it will declare a drought emergency again. This has been going on for years and there is still no specific plan to develop a long-term adequate source and upgrade the distribution system.

In my view DWS planning is hamstrung by the method being used to finance future water sources. Instead of thinking big and financing such construction by issuing general

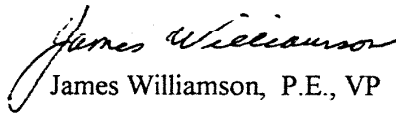
obligation or revenue bonds, financing is provided from a system development fund which is replenished by the sale of water meters. This fund is woefully inadequate even to pay the debt service on bonds. To raise money for new projects the BWS is currently requesting an almost doubling of the cost of new water meters. A serious disadvantage of a policy of relying solely on the sale of water meters to finance new supplies, is that it depends on real estate development and in essence supports such development.

The BWS has to bite the bullet and apply for an increase in water rates which can supplement the fund from the sale of water meters, for source construction. I sat on the water rate committee more than five years ago, which resulted in the current rate schedule being applied over the last five years. A rate increase will be needed next year, even for the ongoing maintenance and operation of the system, but the procedure for such an increase has not been initiated. The process of BWS public hearings and county council hearings for a rate increase approval will take at least two years. Several years ago I advised the BWS chairman to start the next rate increase process.

In conclusion, our County water department is in an absolute need of strong overall planning and management. It is our belief that this can only be achieved by State management of the Iao aquifer ground water system.

Maui Meadows Homeowners Association, therefore, again requests that the CWRM approve designation of the Iao aquifer as a groundwater management area.

Thank you,


James Williamson, P.E., VP

MONTHLY PUMPAGE AND 12-MONTH MOVING MEAN PUMPAGE

Data provided by DWS Maui

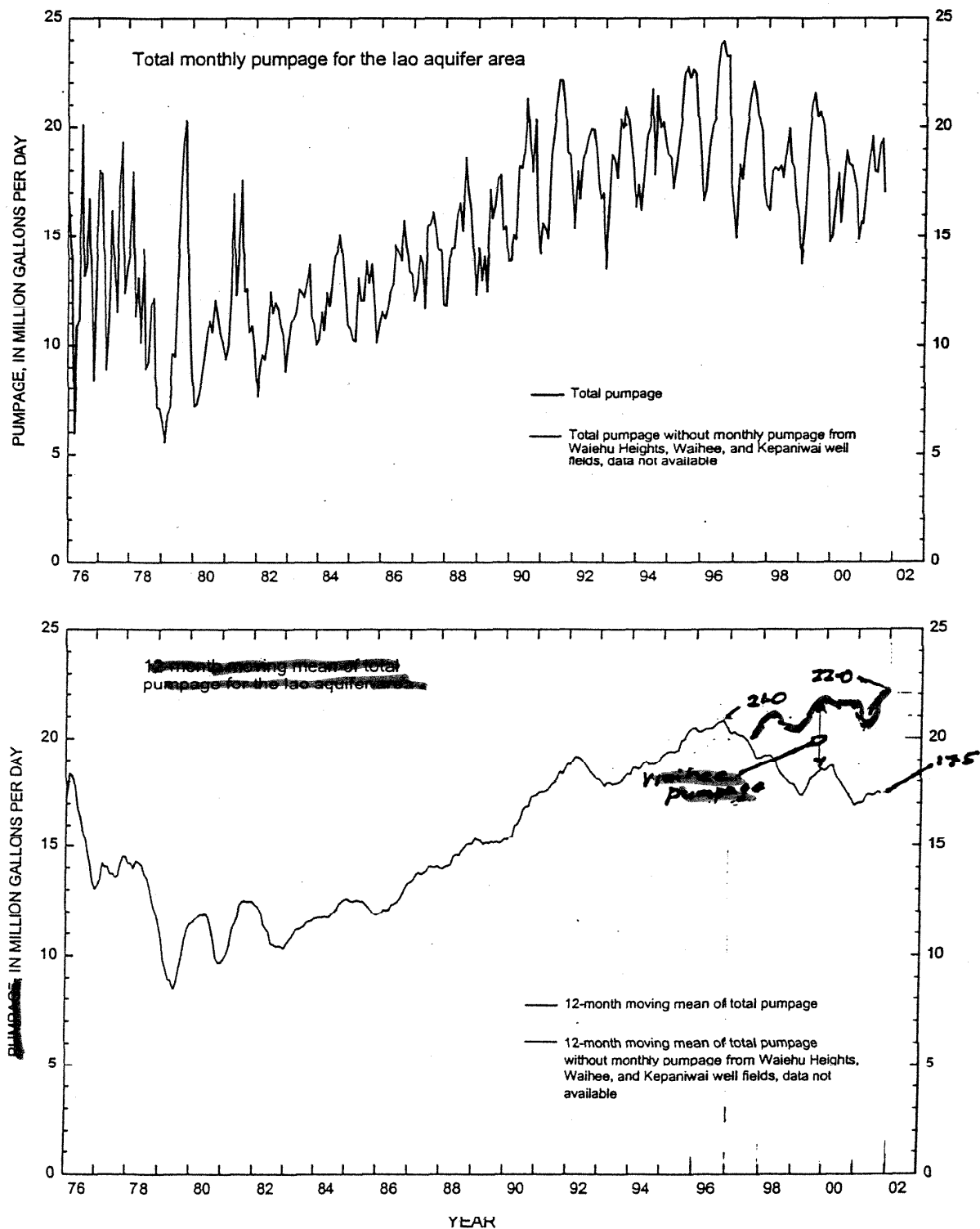


Figure 2

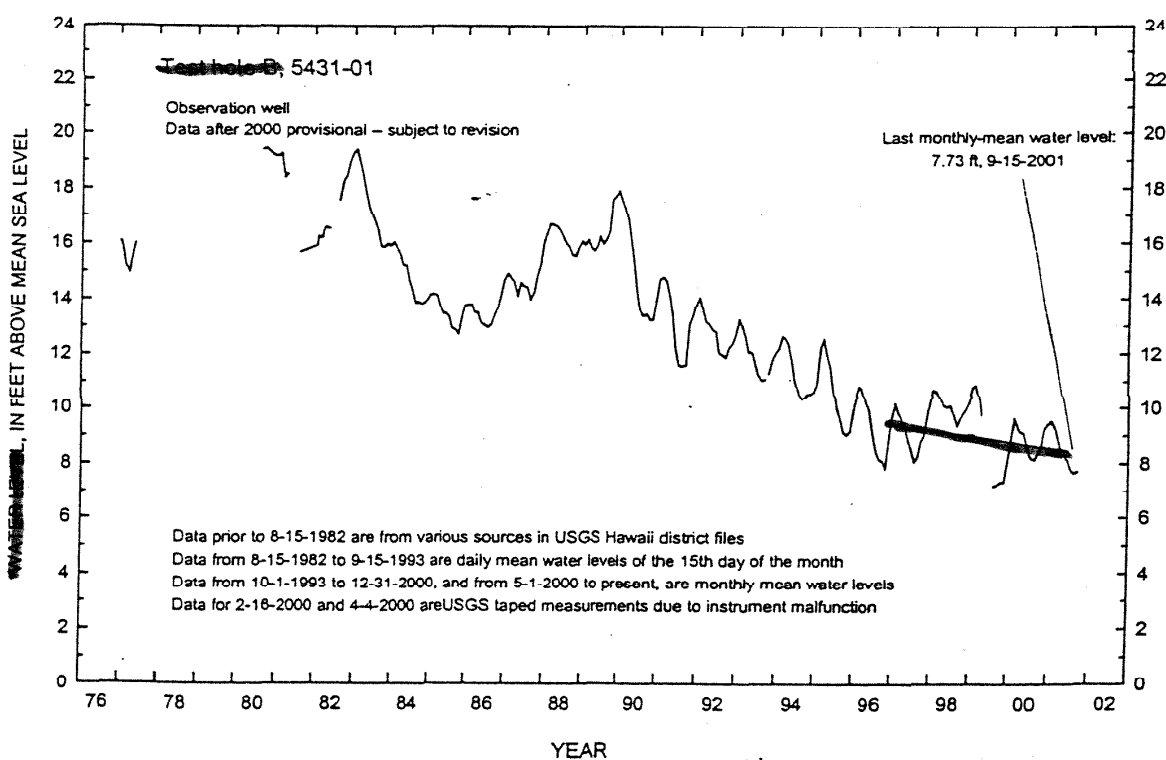
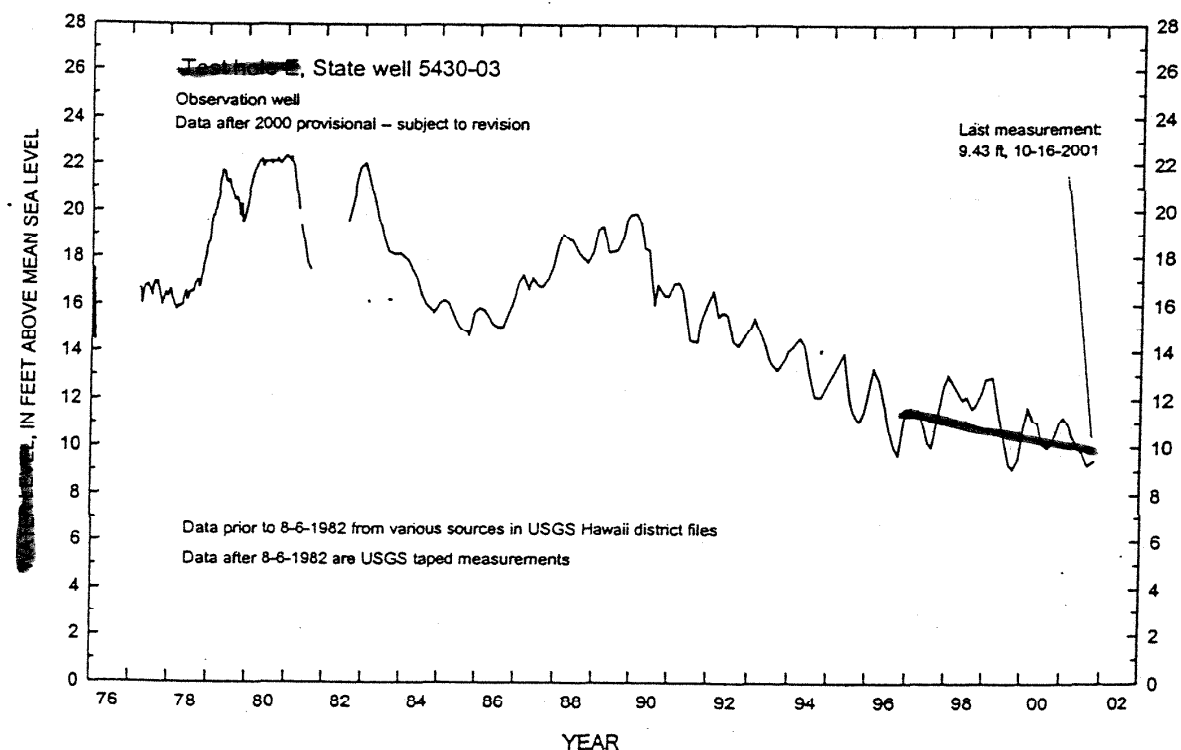


Figure 9

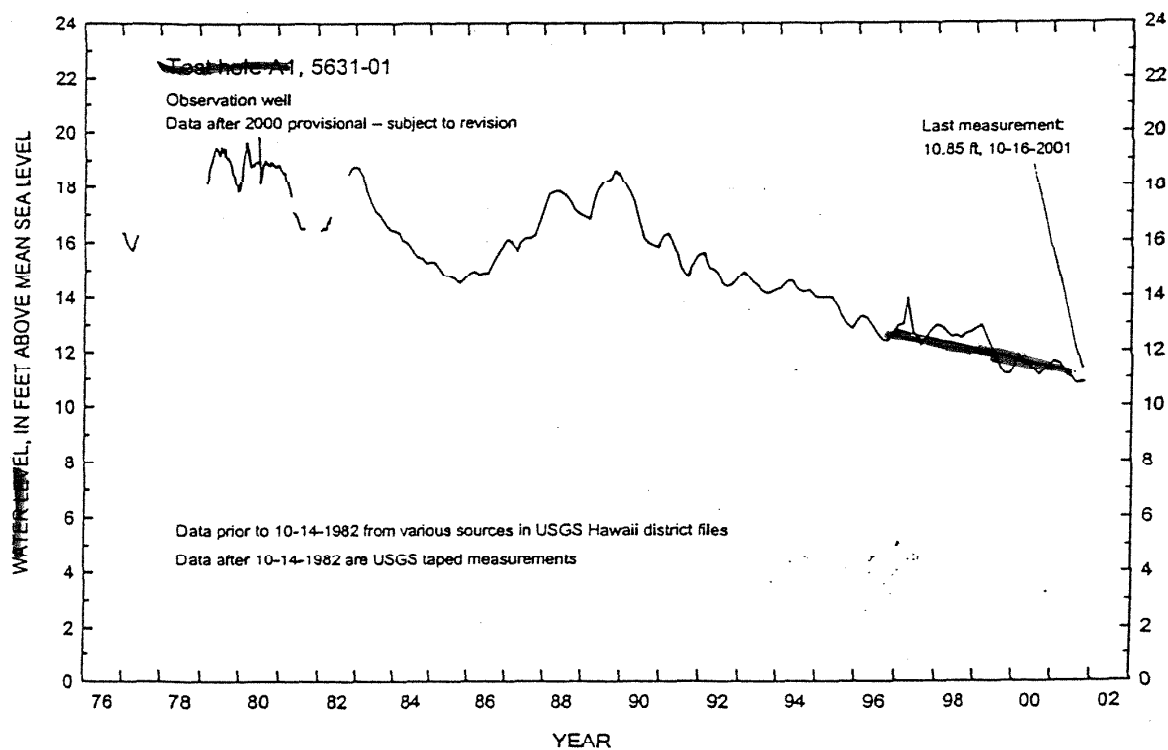
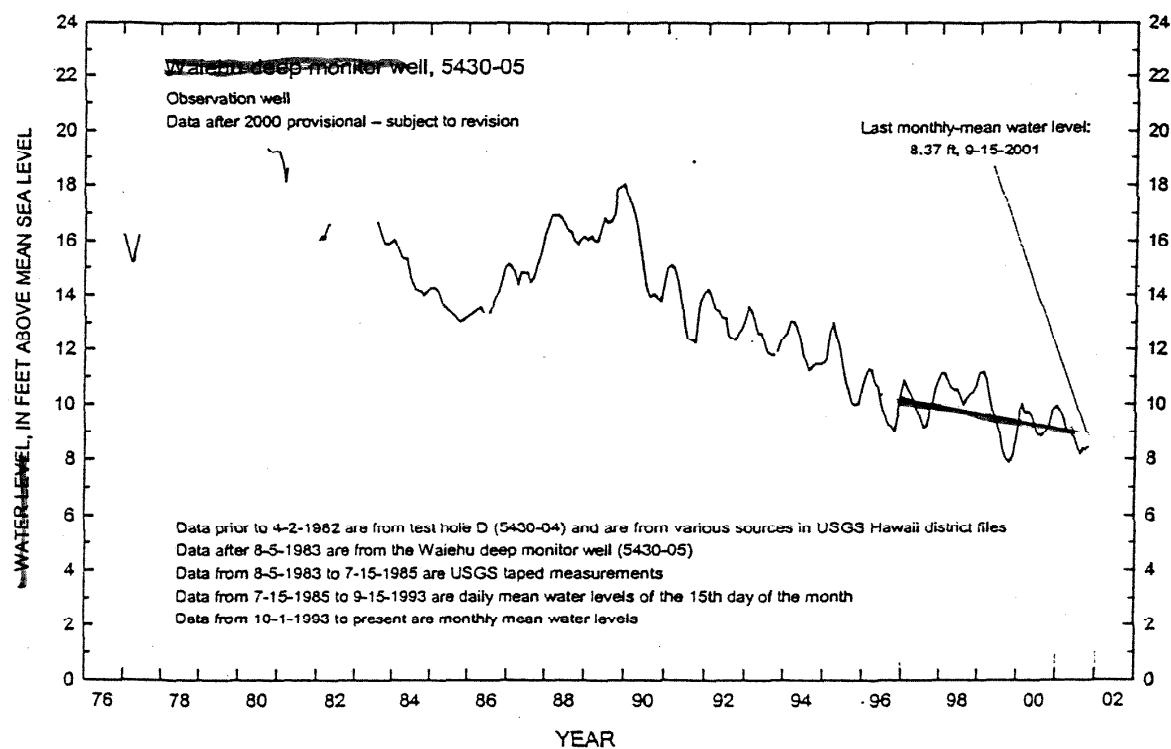


Figure 7

SHAFT 33 PUMPAGE AND WATER LEVELS

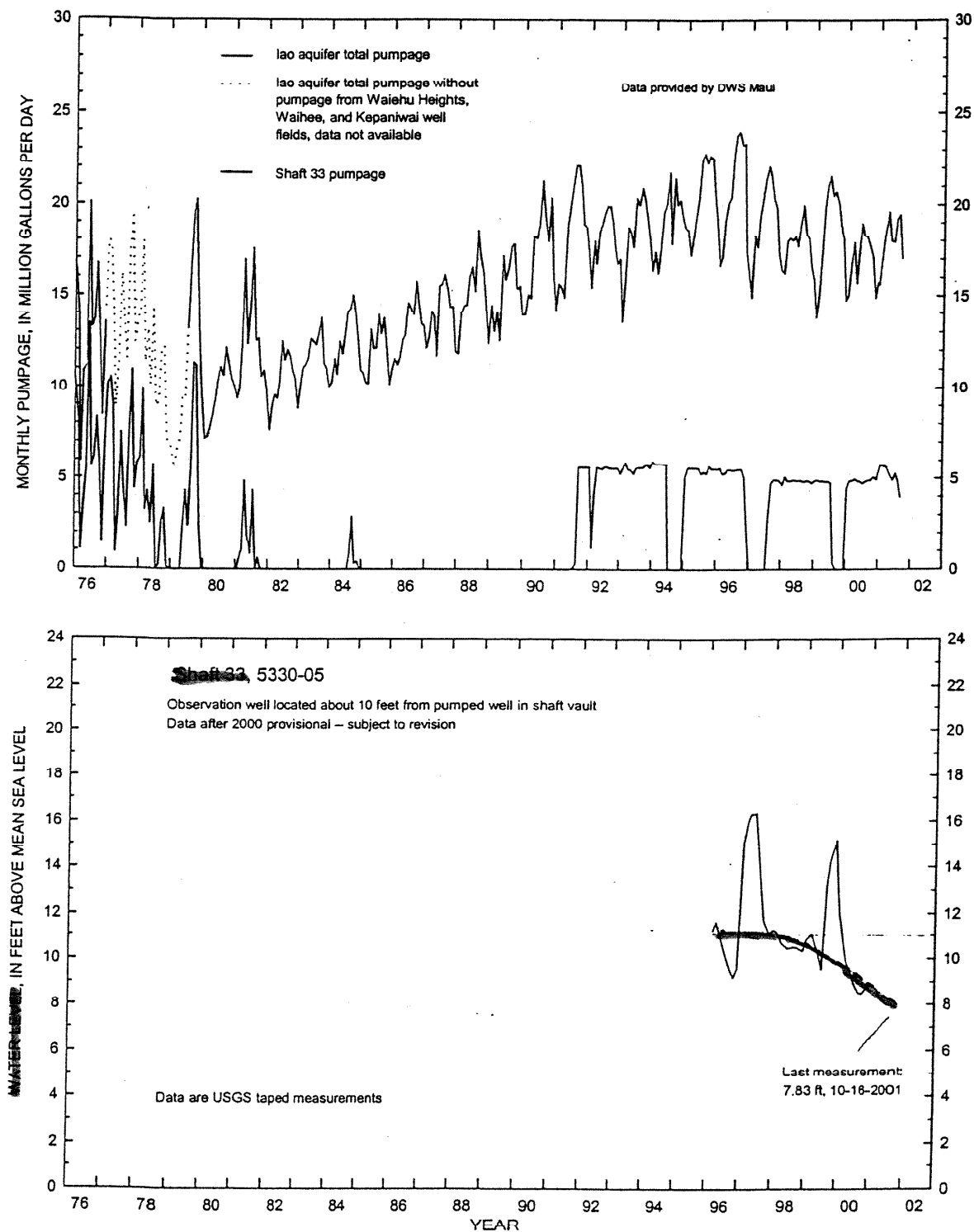


Figure 13

SHAFT 33 PUMPAGE AND CHLORIDE CONCENTRATION

Data provided by DWS Maui

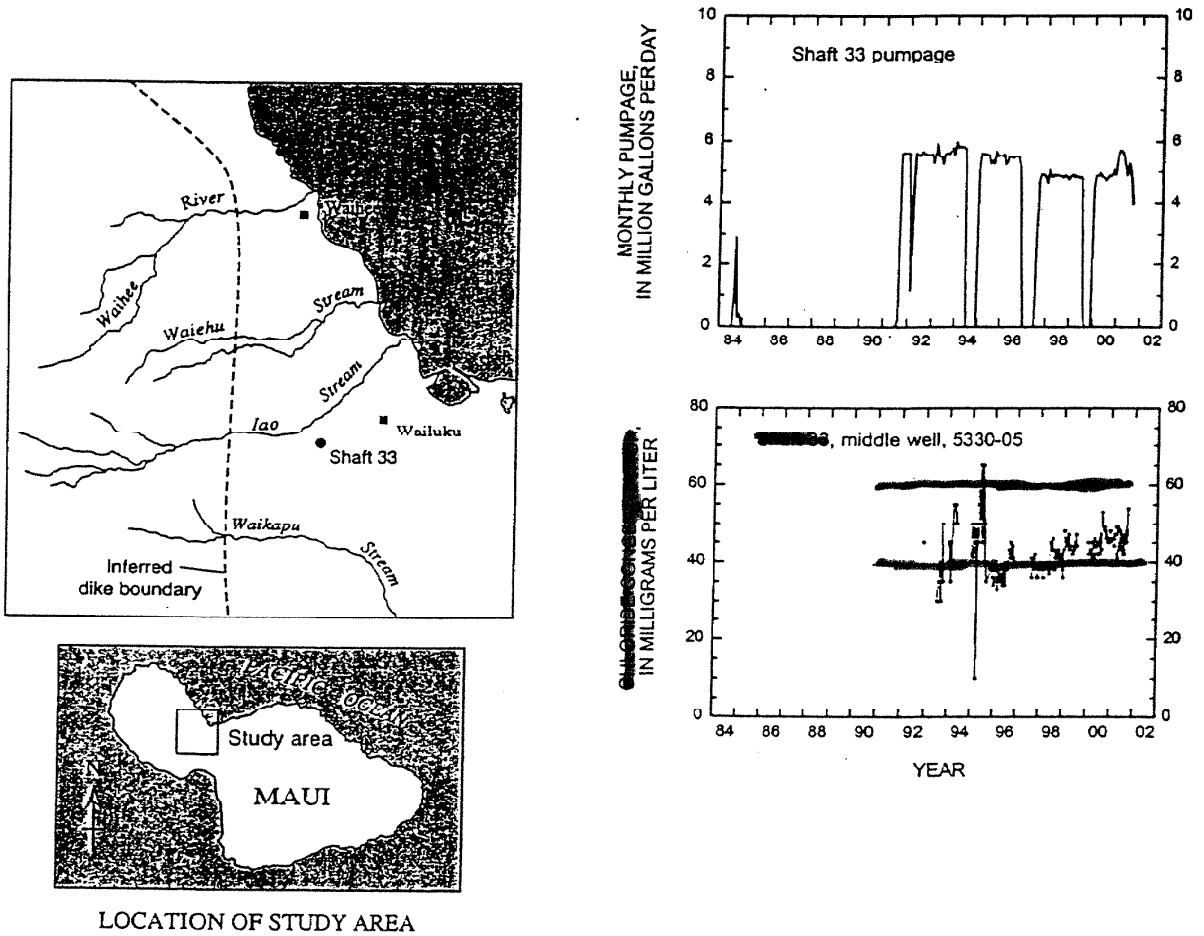


Figure 20

MOKUHAU PUMPAGE AND CHLORIDE CONCENTRATION

Data provided by DWS Maui

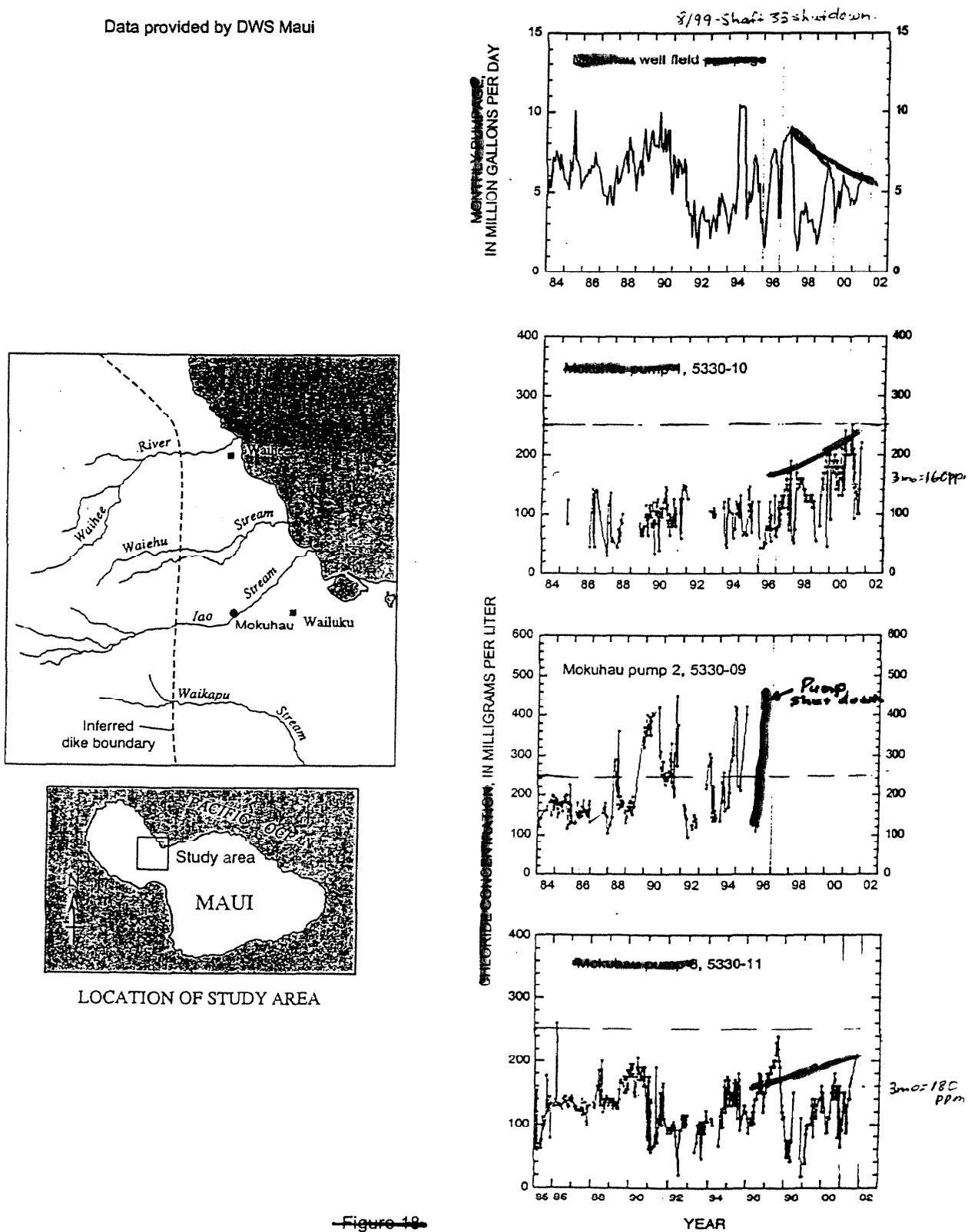


Figure 18

WAIEHU HEIGHTS PUMPAGE AND CHLORIDE CONCENTRATION

Data provided by DWS Maui

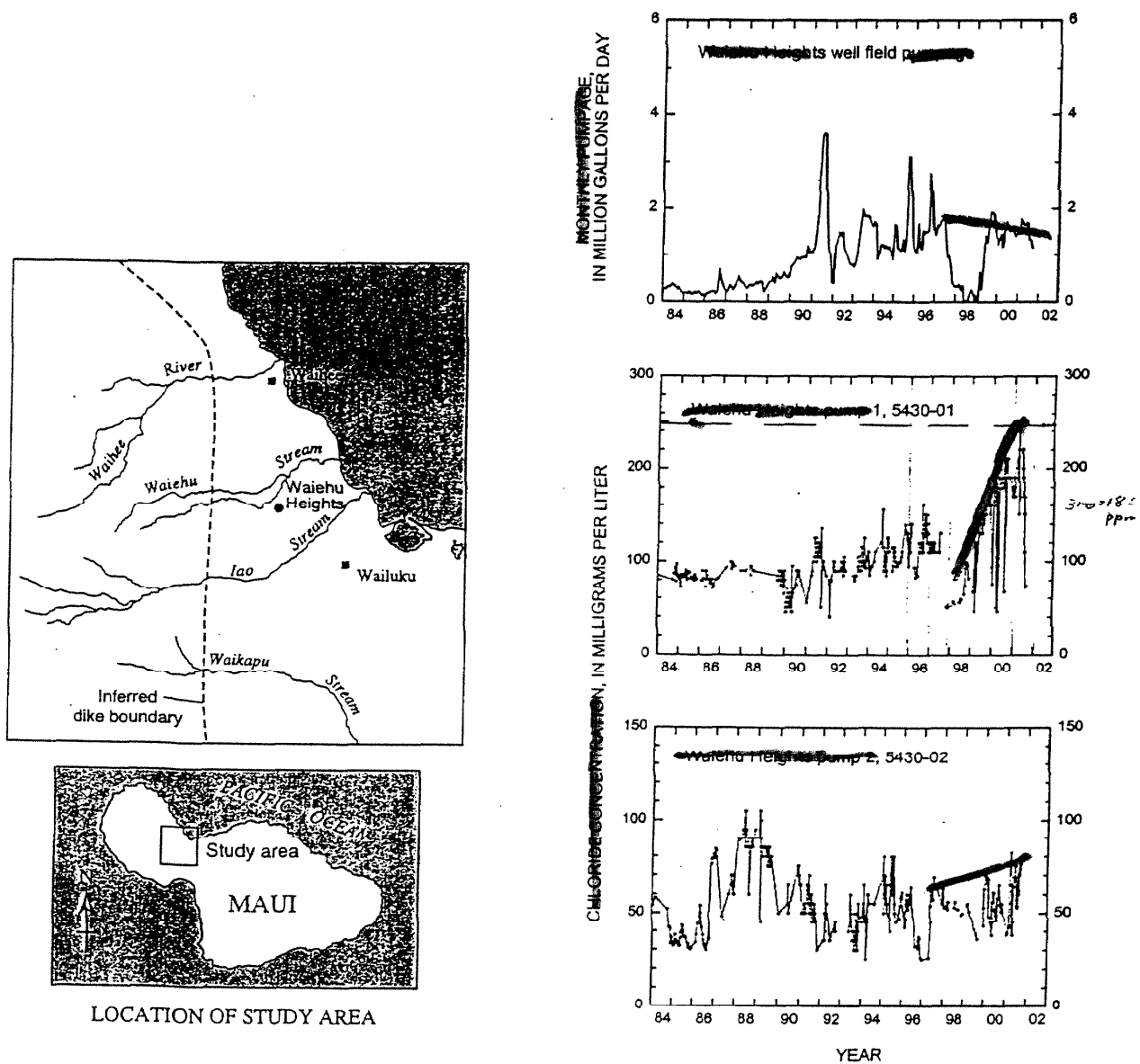


Figure 17.

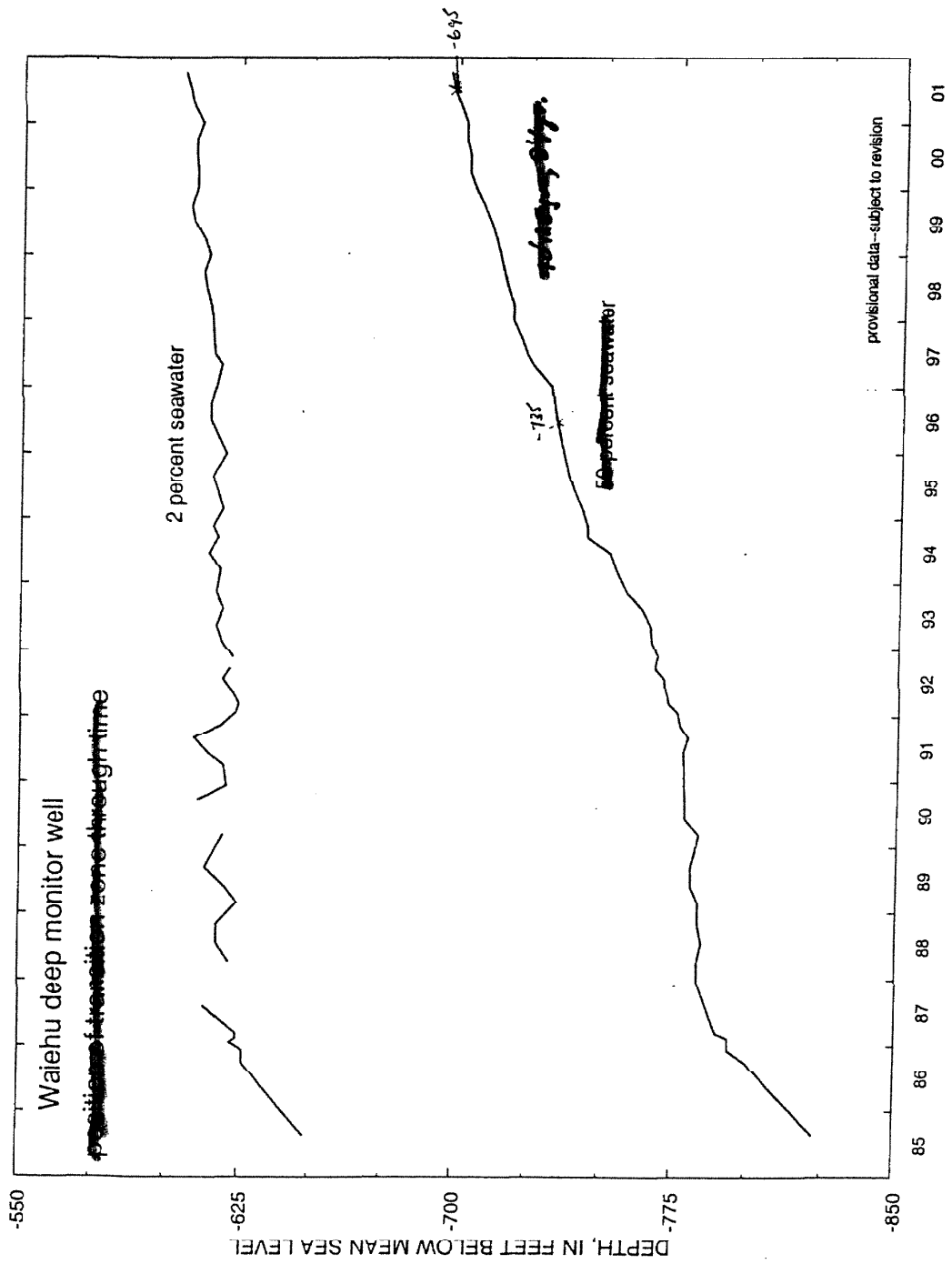


Figure 24



Maui Soda & Ice Works, Ltd.

January 11, 2002

Ms. Linnel T. Nishioka, Deputy Director
Commission on Water Resource Management
P.O. Box 621
Honolulu, HI. 96813

Dear Ms. Nishioka and Commissioners,

RE: Testimony on Continuance Proceedings for the Designation of Iao Aquifer

The Aquifers of Iao and Waihee sustainable yield as set by the Commission to currently be 20MGD for Iao and 8MGD for Waihee. The provisions of our BWS Iao Management Rule set automatic and mandatory actions to take place based on these Sustainable Yield as described above. As currently written, all private wells within these aquifers are exempt.

I am individually opposed to designation. I am also of the opinion that the sustainable yields of these aquifers have not been given enough time due to unusual weather patterns. I am therefore also against any reduction in sustainable yield estimates.

As a resident, born and raised Mauian, I firmly believe that the effects we are seeing at this time are a direct result of the drought, which is an act of God.

I have not encountered the weather patterns we are seeing today for a number of years. I fondly remember these weather patterns to have been considered the normal weather pattern experienced for our islands.

The Board of Water Supply is mandated by Charter to follow the Community Plans and General Plans of the County.

Much of the testimony provided at your public hearing focused on development. Specifically, the fear of some members of the public that the island was being over developed. As a member of the Board of Water Supply for Maui County, the Board would not allow large requestors of water service to come on line without providing for necessary source, transmission and/or storage. The efforts of the Board of Water are well documented as the only County Department that has curbed the natural growth of development on the island.

The Board of Water Supply is extremely proactive in its efforts to secure additional water resources for the entire population of Maui County. Many of these efforts cannot be made public. The change that is taking place with the agricultural landscape of our island is extremely troubling to me. These changes are inevitable but must be explored for their resources to provide for the greater benefit of our people.

There is definitely a lot of work that needs to be completed. A clearer picture of the total use of Iao aquifer is needed that includes private production. A complete Water Use plan for the County has been budgeted and contract awarded. Work will begin very soon.

I thank you for this opportunity to express my individual concerns.

Respectfully,


Michael A. Nobriga

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